FIG. 1

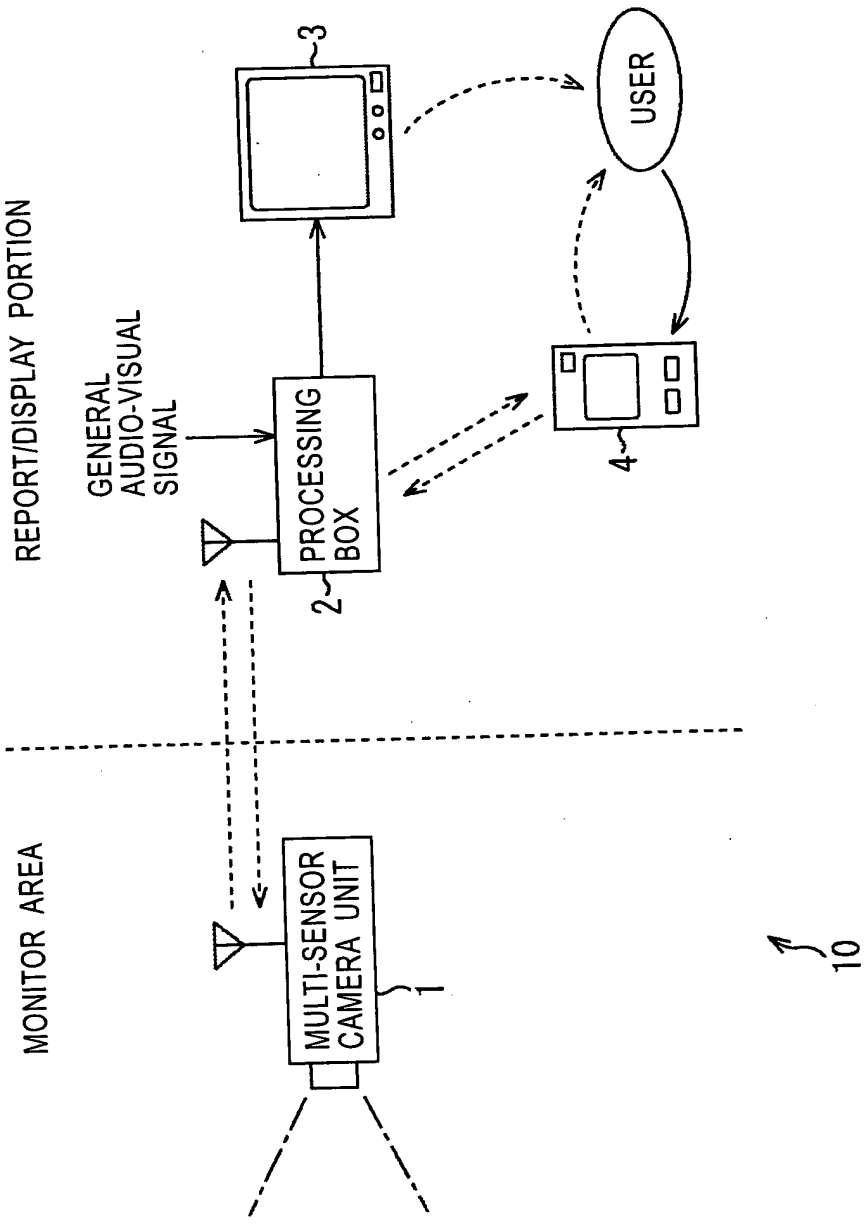

REPORT/DISPLAY PORTION
GENERAL AUDIO-VISUAL SIGNAL
PROCESSING BOX
2
3
USER
4
MONITOR AREA
MULTI-SENSOR CAMERA UNIT
1
10

FIG. 2

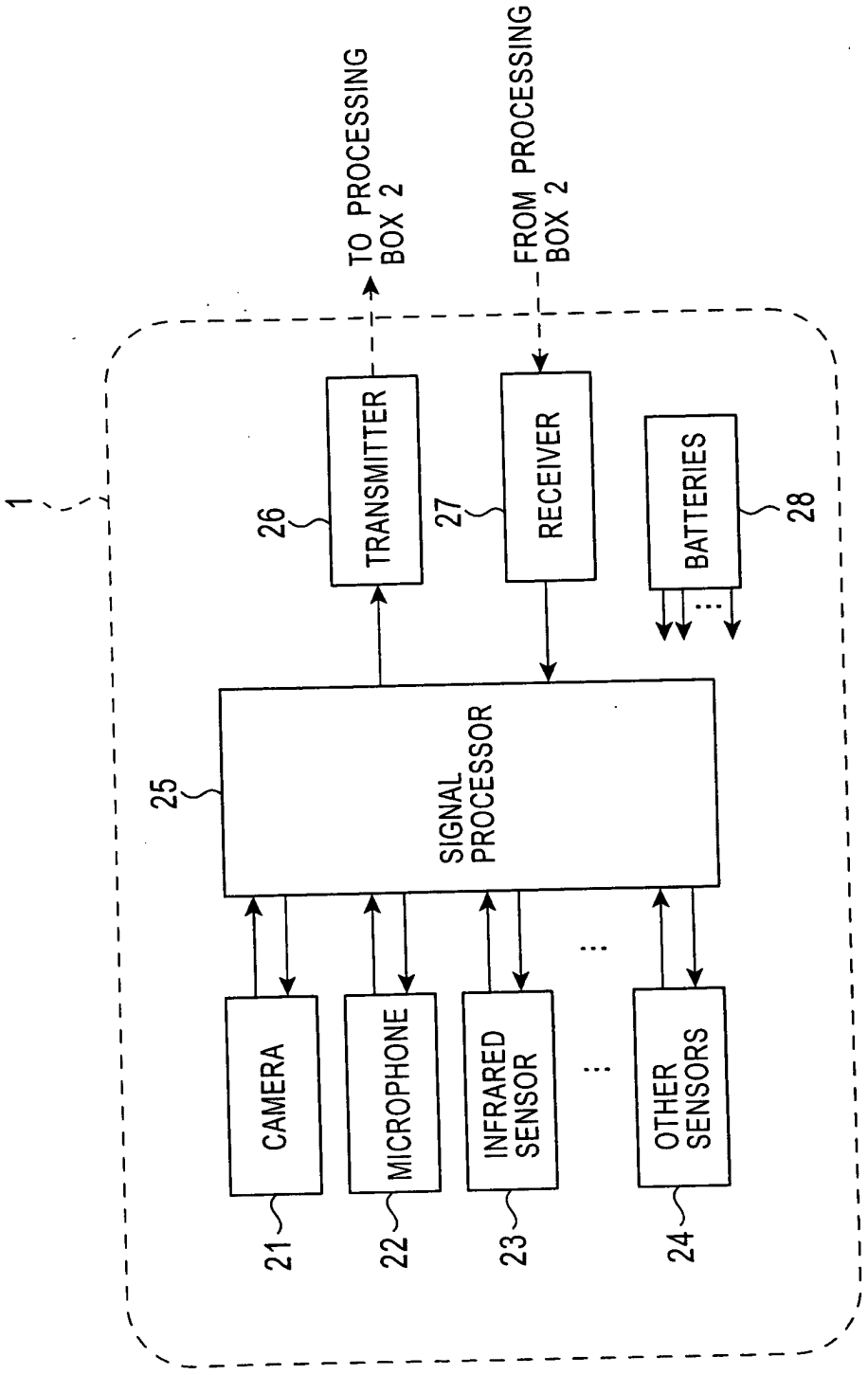

1
TO PROCESSING BOX 2
FROM PROCESSING BOX 2
TRANSMITTER
26
RECEIVER
27
BATTERIES
28
SIGNAL PROCESSOR
25
CAMERA
MICROPHONE
INFRARED SENSOR
OTHER SENSORS
21
22
23
24

FIG. 3

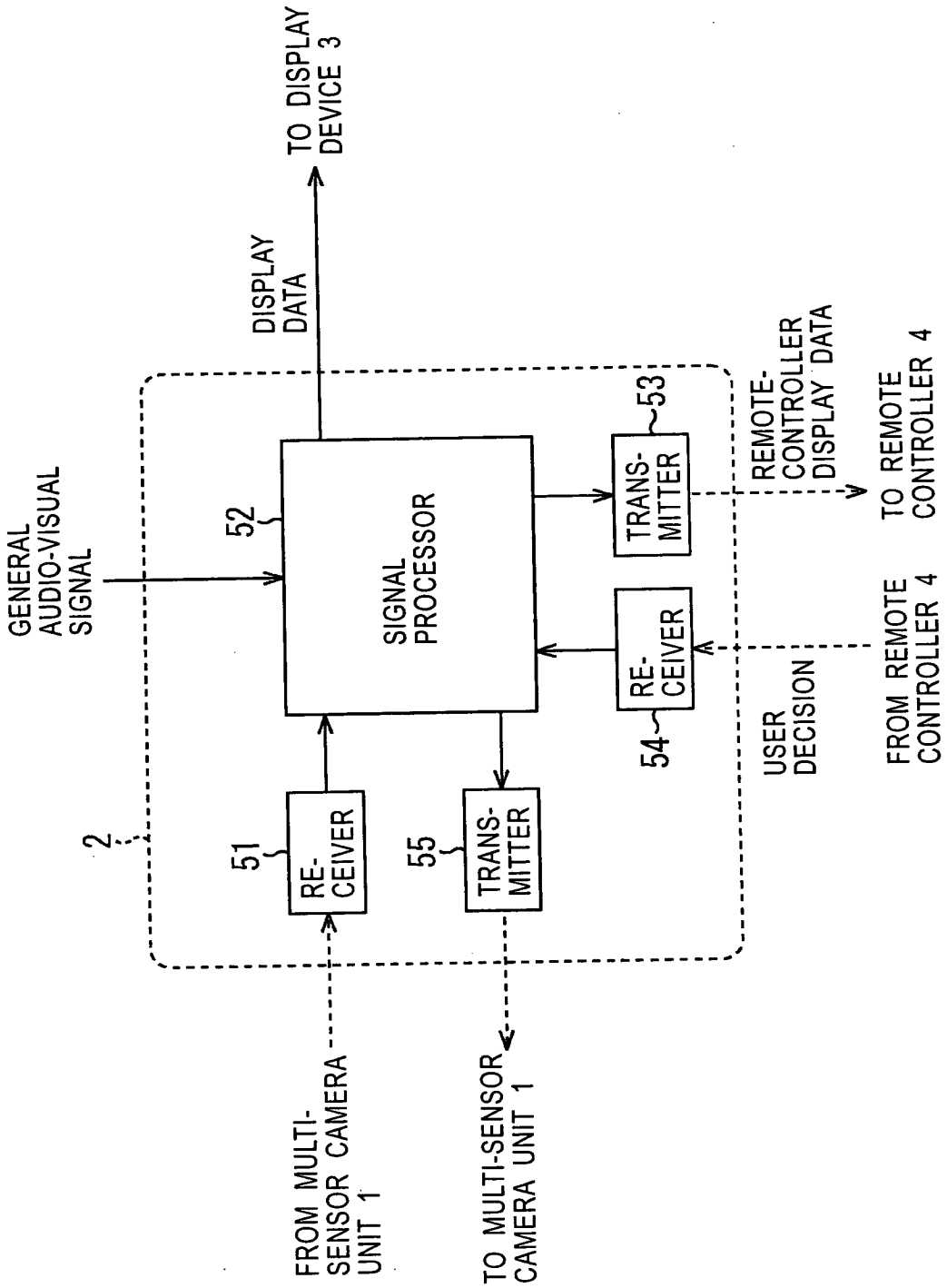

TO DISPLAY DEVICE 3
DISPLAY DATA
GENERAL AUDIO-VISUAL SIGNAL
52
SIGNAL PROCESSOR
TRANS-MITTER
53
REMOTE-CONTROLLER DISPLAY DATA
TO REMOTE CONTROLLER 4
RE-CEIVER
54
USER DECISION
FROM REMOTE CONTROLLER 4
2
51
RE-CEIVER
55
TRANS-MITTER
FROM MULTI-SENSOR CAMERA UNIT 1
TO MULTI-SENSOR CAMERA UNIT 1

FIG. 4

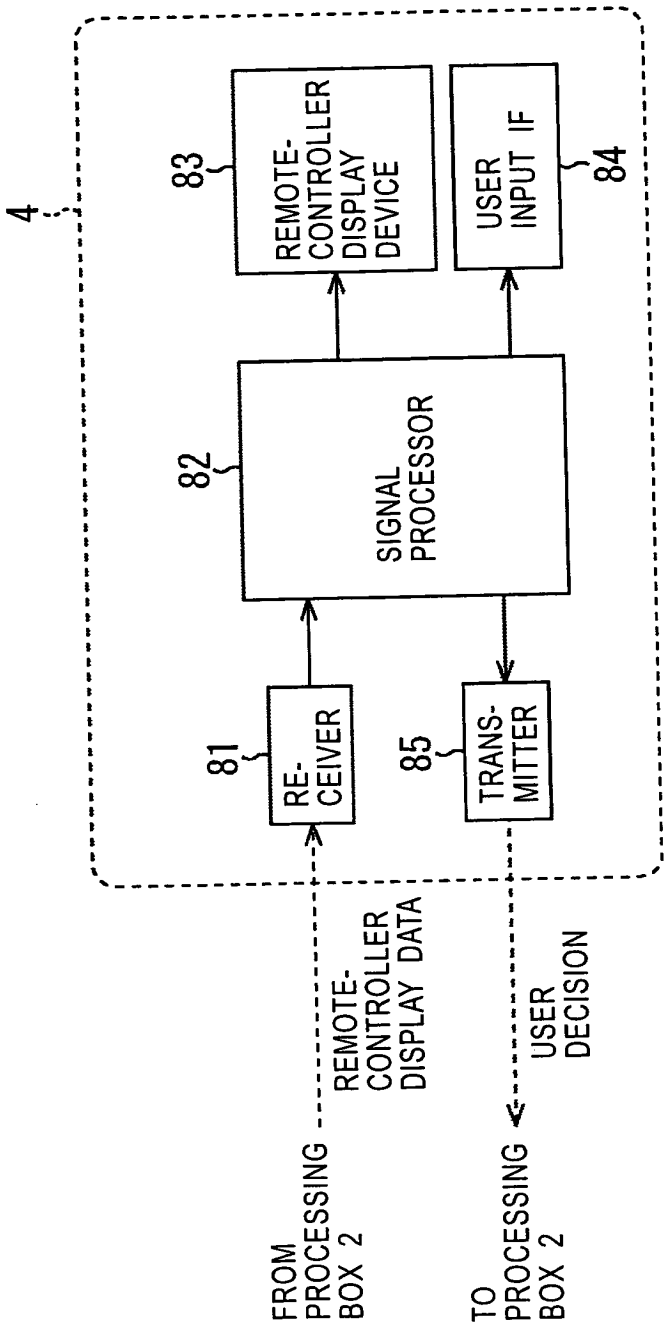

4
83
REMOTE-CONTROLLER DISPLAY DEVICE
84
USER INPUT IF
82
SIGNAL PROCESSOR
81
RE-CEIVER
85
TRANS-MITTER
FROM PROCESSING BOX 2
REMOTE-CONTROLLER DISPLAY DATA
TO PROCESSING BOX 2
USER DECISION

FIG. 5

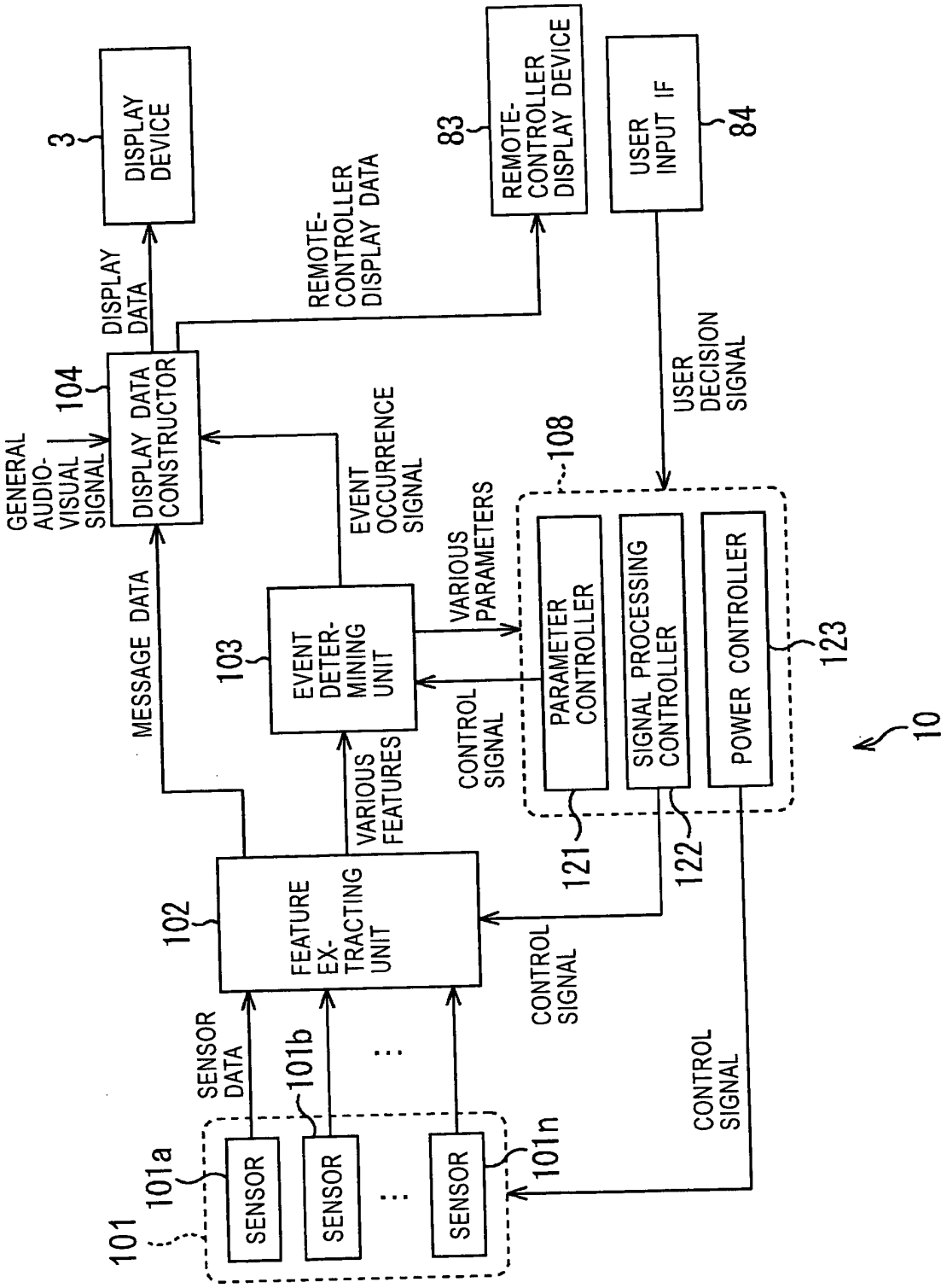

3
DISPLAY DEVICE
83
REMOTE-CONTROLLER DISPLAY DEVICE
84
USER INPUT IF
DISPLAY DATA
REMOTE-CONTROLLER DISPLAY DATA
USER DECISION SIGNAL
104
DISPLAY DATA CONSTRUCTOR
GENERAL AUDIO-VISUAL SIGNAL
EVENT OCCURRENCE SIGNAL
108
MESSAGE DATA
103
EVENT DETER-MINING UNIT
VARIOUS PARAMETERS
PARAMETER CONTROLLER
SIGNAL PROCESSING CONTROLLER
POWER CONTROLLER
123
10
CONTROL SIGNAL
VARIOUS FEATURES
102
FEATURE EX-TRACTING UNIT
121
122
CONTROL SIGNAL
CONTROL SIGNAL
SENSOR DATA
101
101a
101b
101n
SENSOR
SENSOR
SENSOR

FIG. 6

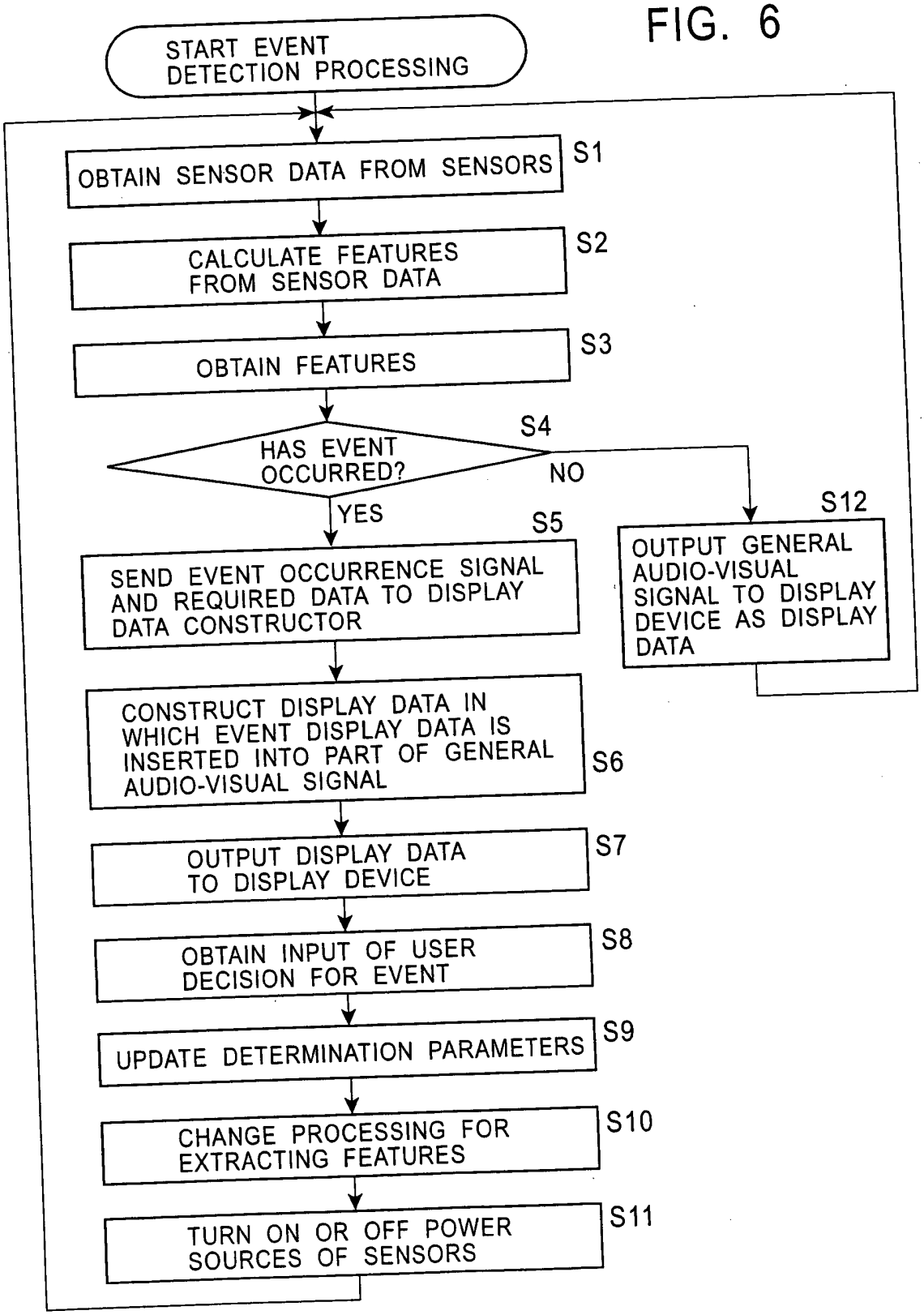

START EVENT DETECTION PROCESSING
OBTAIN SENSOR DATA FROM SENSORS
S1
CALCULATE FEATURES FROM SENSOR DATA
S2
OBTAIN FEATURES
S3
HAS EVENT OCCURRED?
S4
NO
YES
S12
OUTPUT GENERAL AUDIO-VISUAL SIGNAL TO DISPLAY DEVICE AS DISPLAY DATA
S5
SEND EVENT OCCURRENCE SIGNAL AND REQUIRED DATA TO DISPLAY DATA CONSTRUCTOR
CONSTRUCT DISPLAY DATA IN WHICH EVENT DISPLAY DATA IS INSERTED INTO PART OF GENERAL AUDIO-VISUAL SIGNAL
S6
OUTPUT DISPLAY DATA TO DISPLAY DEVICE
S7
OBTAIN INPUT OF USER DECISION FOR EVENT
S8
UPDATE DETERMINATION PARAMETERS
S9
CHANGE PROCESSING FOR EXTRACTING FEATURES
S10
TURN ON OR OFF POWER SOURCES OF SENSORS
S11

FIG. 7

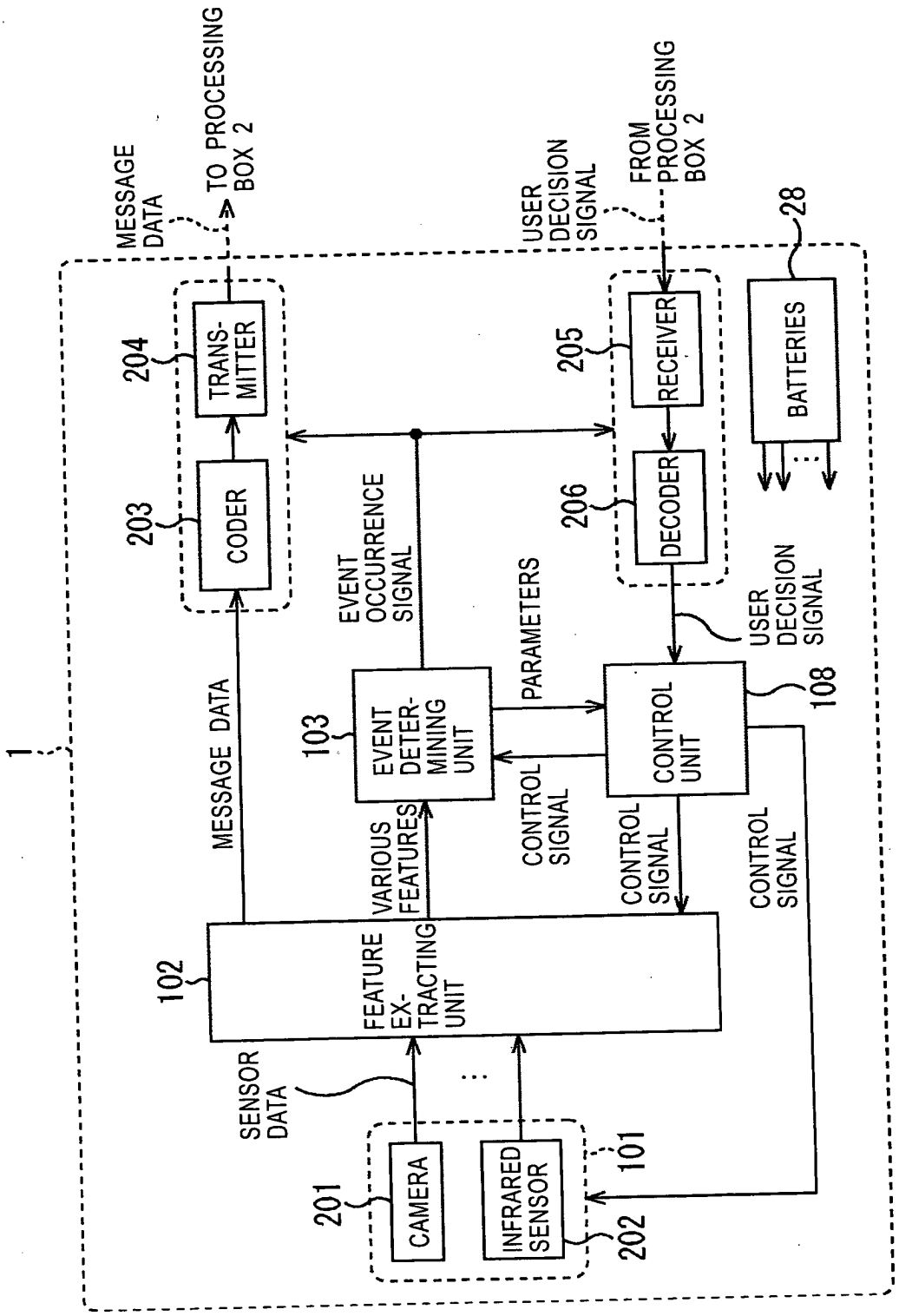

1
MESSAGE DATA
TO PROCESSING BOX 2
USER DECISION SIGNAL
FROM PROCESSING BOX 2
28
BATTERIES
204
TRANS-MITTER
205
RECEIVER
203
CODER
206
DECODER
EVENT OCCURRENCE SIGNAL
PARAMETERS
USER DECISION SIGNAL
103
EVENT DETER-MINING UNIT
CONTROL UNIT
108
MESSAGE DATA
VARIOUS FEATURES
CONTROL SIGNAL
CONTROL SIGNAL
CONTROL SIGNAL
102
FEATURE EX-TRACTING UNIT
SENSOR DATA
201
CAMERA
INFRARED SENSOR
202
101

FIG. 8

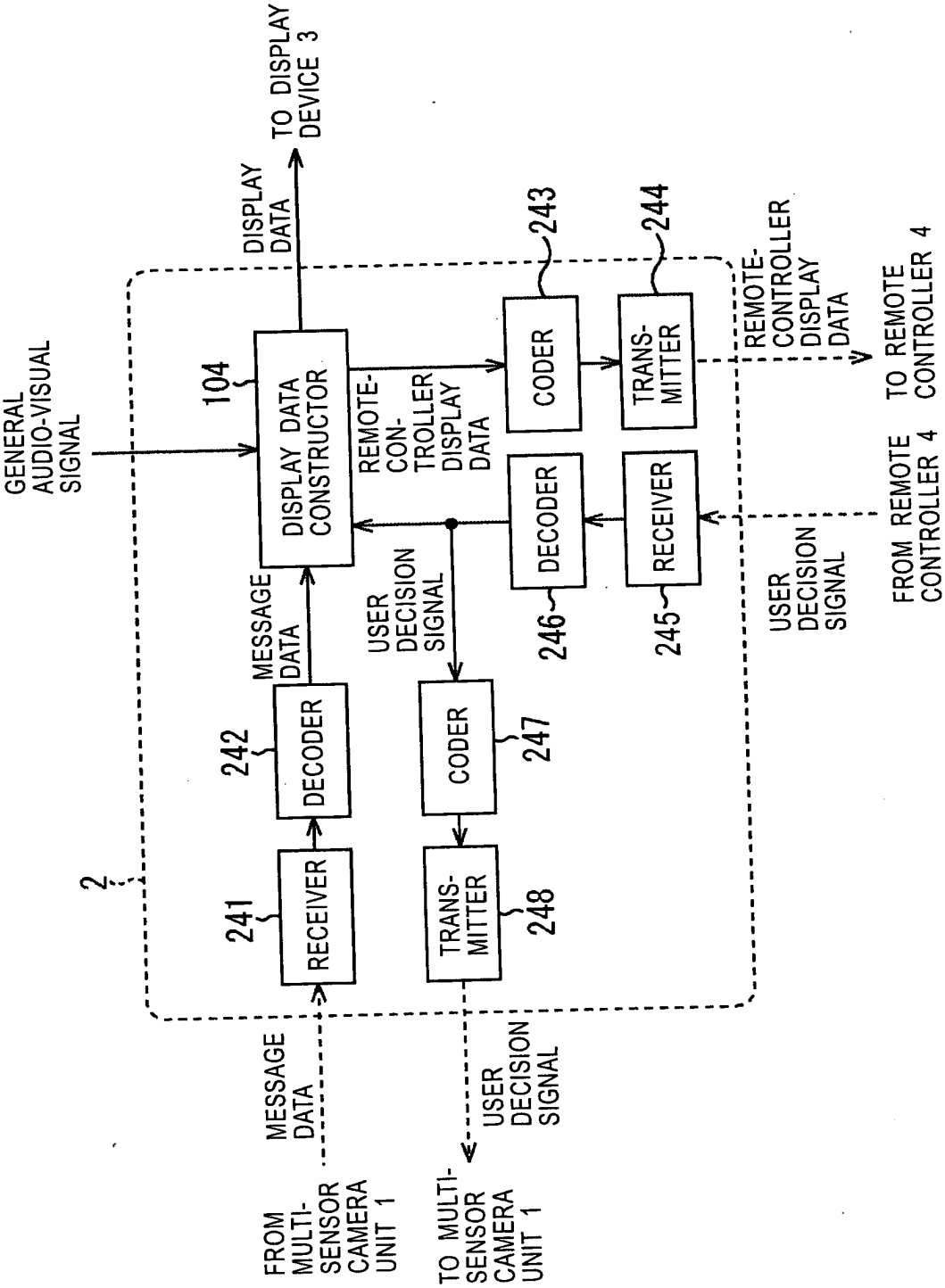

GENERAL AUDIO-VISUAL SIGNAL
DISPLAY DATA
TO DISPLAY DEVICE 3
104
DISPLAY DATA CONSTRUCTOR
REMOTE-CONTROLLER DISPLAY DATA
CODER
243
TRANS-MITTER
244
REMOTE-CONTROLLER DISPLAY DATA
TO REMOTE CONTROLLER 4
FROM REMOTE CONTROLLER 4
USER DECISION SIGNAL
DECODER
246
RECEIVER
245
MESSAGE DATA
USER DECISION SIGNAL
242
DECODER
CODER
247
241
RECEIVER
TRANS-MITTER
248
2
MESSAGE DATA
USER DECISION SIGNAL
FROM MULTI-SENSOR CAMERA UNIT 1
TO MULTI-SENSOR CAMERA UNIT 1

FIG. 9

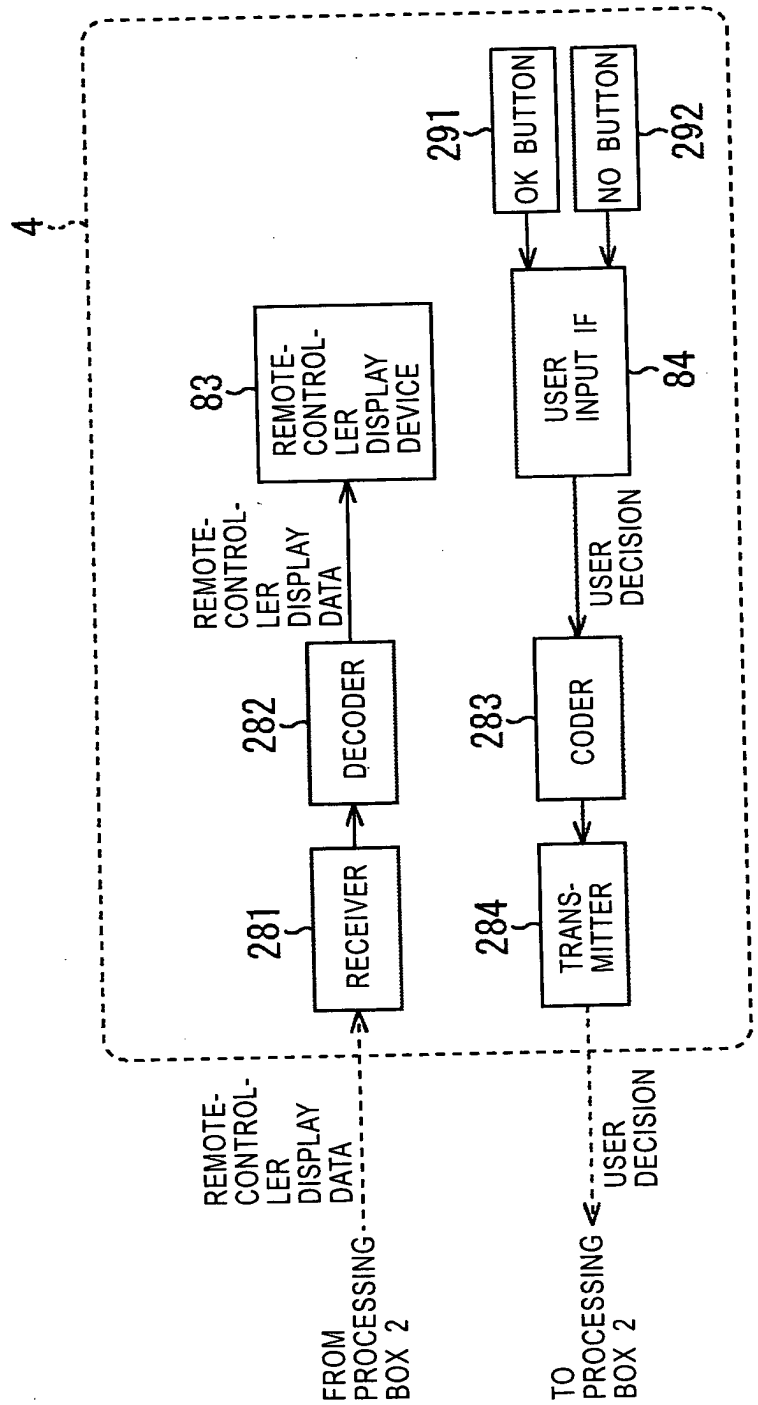

4
291
OK BUTTON
292
NO BUTTON
83
REMOTE-CONTROL-LER DISPLAY DEVICE
USER INPUT IF
84
REMOTE-CONTROL-LER DISPLAY DATA
USER DECISION
282
DECODER
283
CODER
281
RECEIVER
284
TRANS-MITTER
REMOTE-CONTROL-LER DISPLAY DATA
FROM PROCESSING BOX 2
USER DECISION
TO PROCESSING BOX 2

FIG. 10

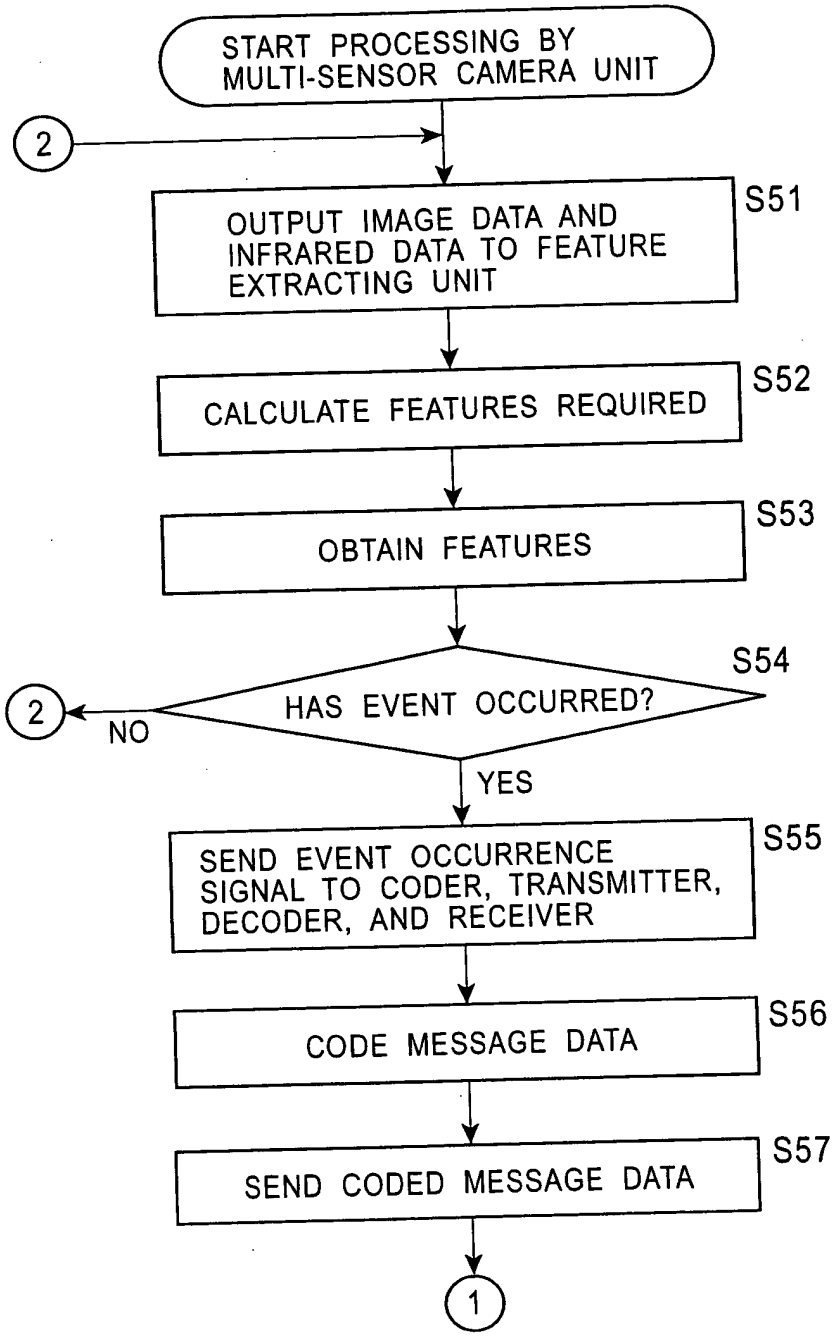

START PROCESSING BY MULTI-SENSOR CAMERA UNIT
2
OUTPUT IMAGE DATA AND INFRARED DATA TO FEATURE EXTRACTING UNIT
S51
CALCULATE FEATURES REQUIRED
S52
OBTAIN FEATURES
S53
HAS EVENT OCCURRED?
S54
NO
2
YES
SEND EVENT OCCURRENCE SIGNAL TO CODER, TRANSMITTER, DECODER, AND RECEIVER
S55
CODE MESSAGE DATA
S56
SEND CODED MESSAGE DATA
S57
1

FIG. 11

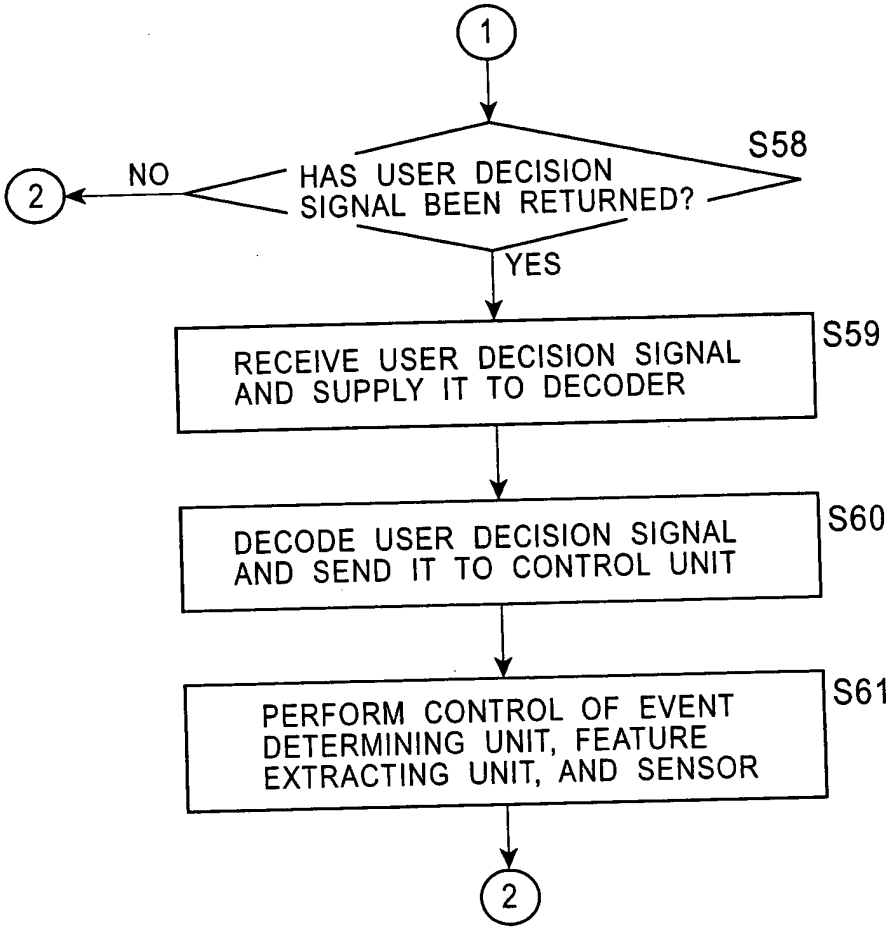

1
S58
HAS USER DECISION SIGNAL BEEN RETURNED?
NO
2
YES
RECEIVE USER DECISION SIGNAL AND SUPPLY IT TO DECODER
S59
DECODE USER DECISION SIGNAL AND SEND IT TO CONTROL UNIT
S60
PERFORM CONTROL OF EVENT DETERMINING UNIT, FEATURE EXTRACTING UNIT, AND SENSOR
S61
2

FIG. 12

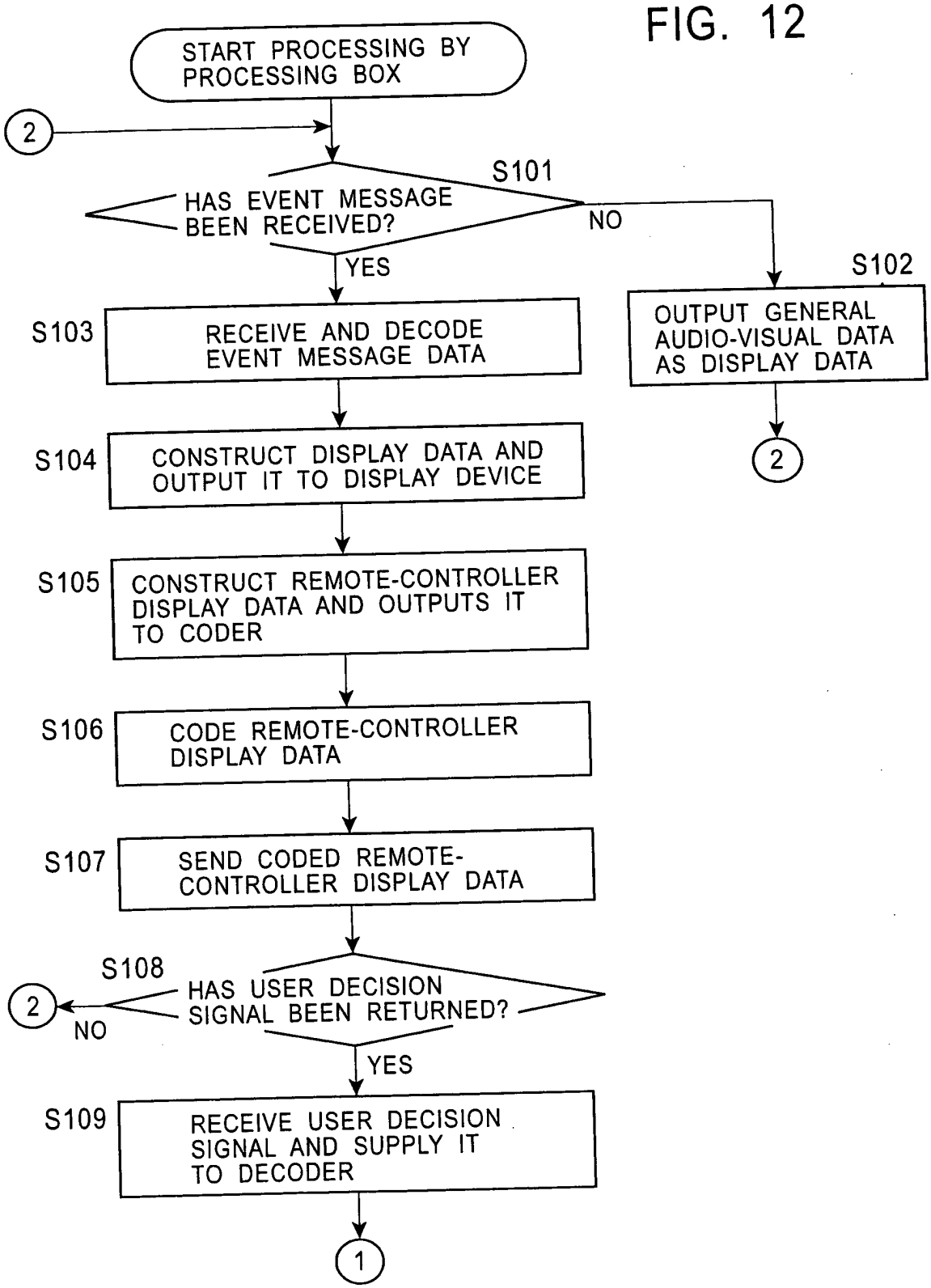

START PROCESSING BY PROCESSING BOX
2
S101
HAS EVENT MESSAGE BEEN RECEIVED?
NO
YES
S102
OUTPUT GENERAL AUDIO-VISUAL DATA AS DISPLAY DATA
2
S103
RECEIVE AND DECODE EVENT MESSAGE DATA
S104
CONSTRUCT DISPLAY DATA AND OUTPUT IT TO DISPLAY DEVICE
S105
CONSTRUCT REMOTE-CONTROLLER DISPLAY DATA AND OUTPUTS IT TO CODER
S106
CODE REMOTE-CONTROLLER DISPLAY DATA
S107
SEND CODED REMOTE-CONTROLLER DISPLAY DATA
S108
HAS USER DECISION SIGNAL BEEN RETURNED?
2
NO
YES
S109
RECEIVE USER DECISION SIGNAL AND SUPPLY IT TO DECODER
1

FIG. 13

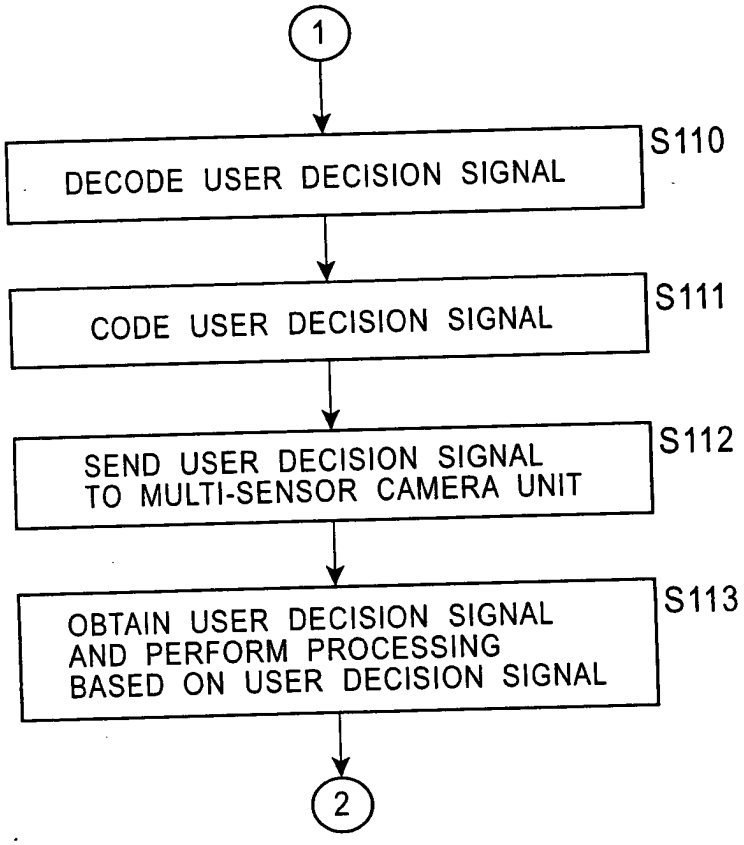

1
DECODE USER DECISION SIGNAL
S110
CODE USER DECISION SIGNAL
S111
SEND USER DECISION SIGNAL TO MULTI-SENSOR CAMERA UNIT
S112
OBTAIN USER DECISION SIGNAL AND PERFORM PROCESSING BASED ON USER DECISION SIGNAL
S113
2

FIG. 14

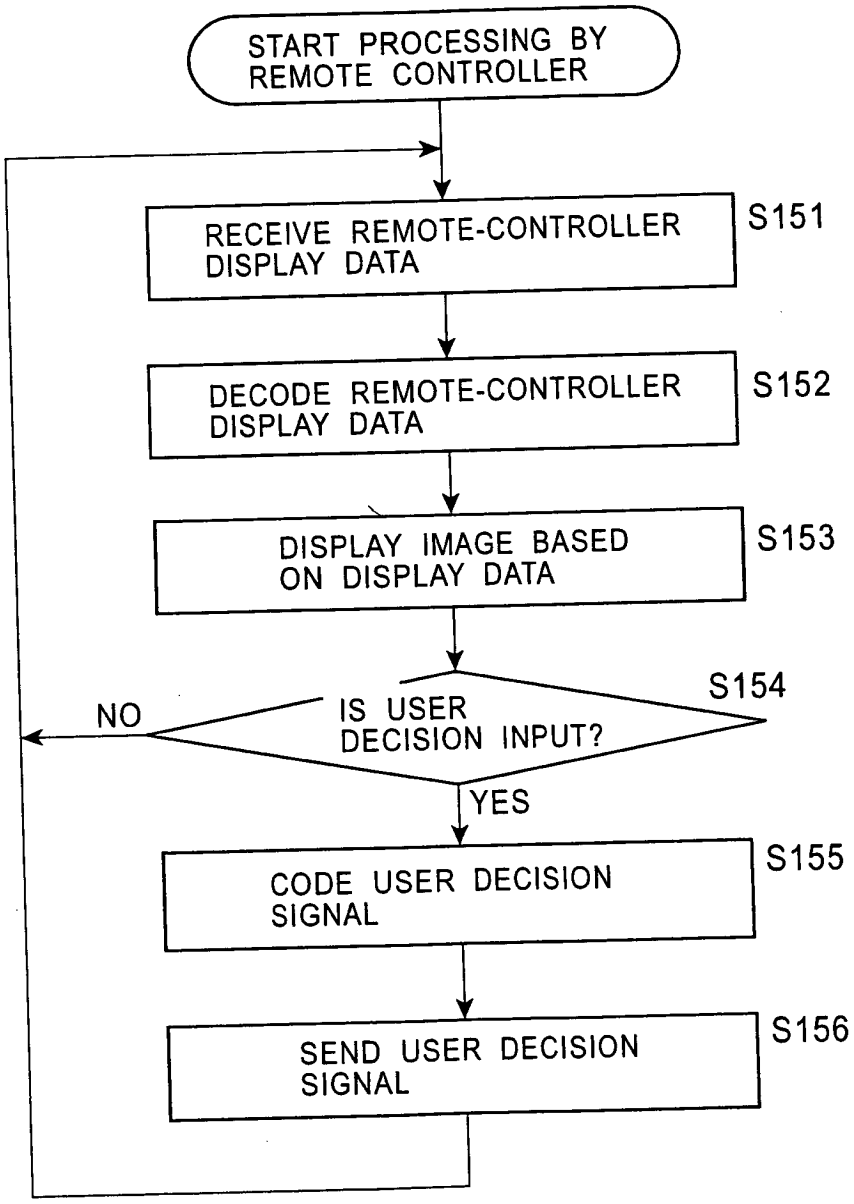

START PROCESSING BY REMOTE CONTROLLER
RECEIVE REMOTE-CONTROLLER DISPLAY DATA
S151
DECODE REMOTE-CONTROLLER DISPLAY DATA
S152
DISPLAY IMAGE BASED ON DISPLAY DATA
S153
IS USER DECISION INPUT?
S154
NO
YES
CODE USER DECISION SIGNAL
S155
SEND USER DECISION SIGNAL
S156

FIG. 15

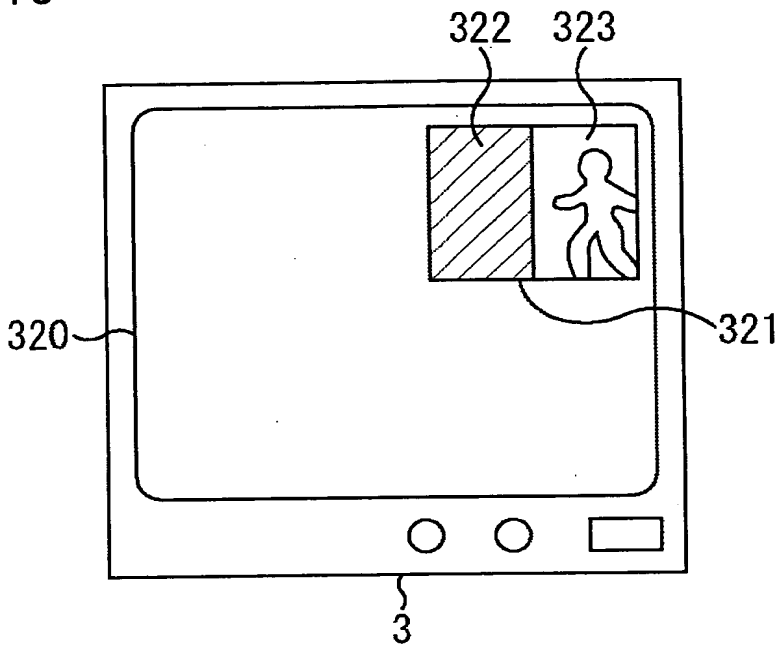


FIG. 16

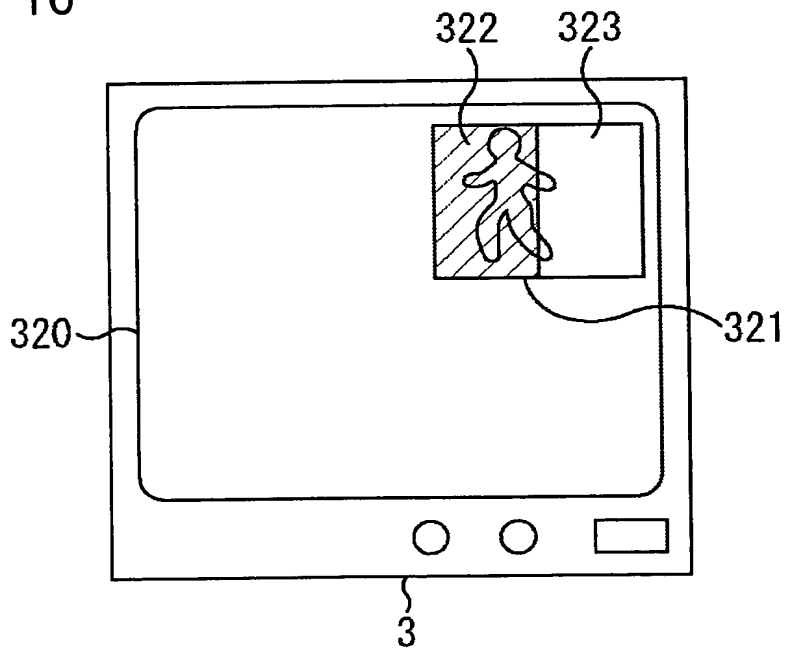


FIG. 17

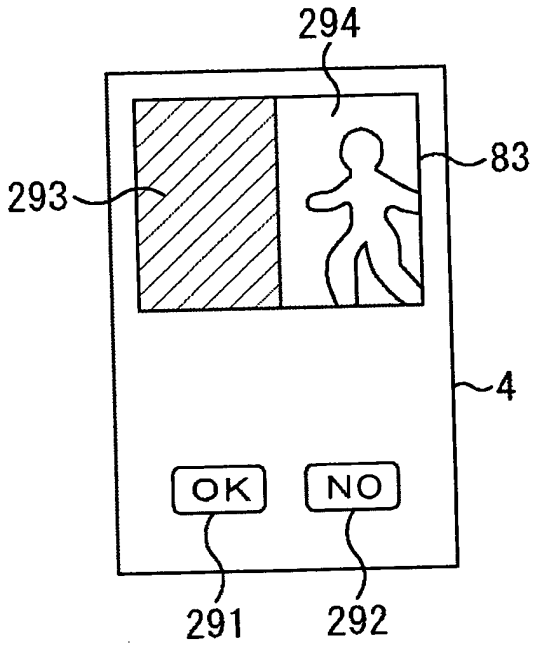


FIG. 18

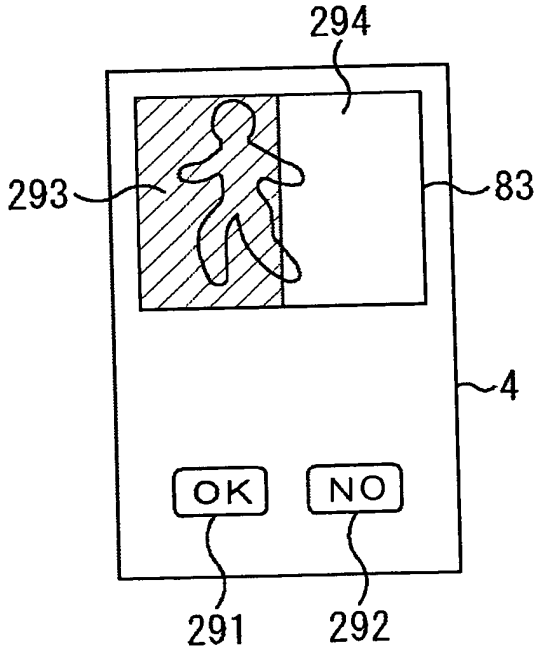


FIG. 19

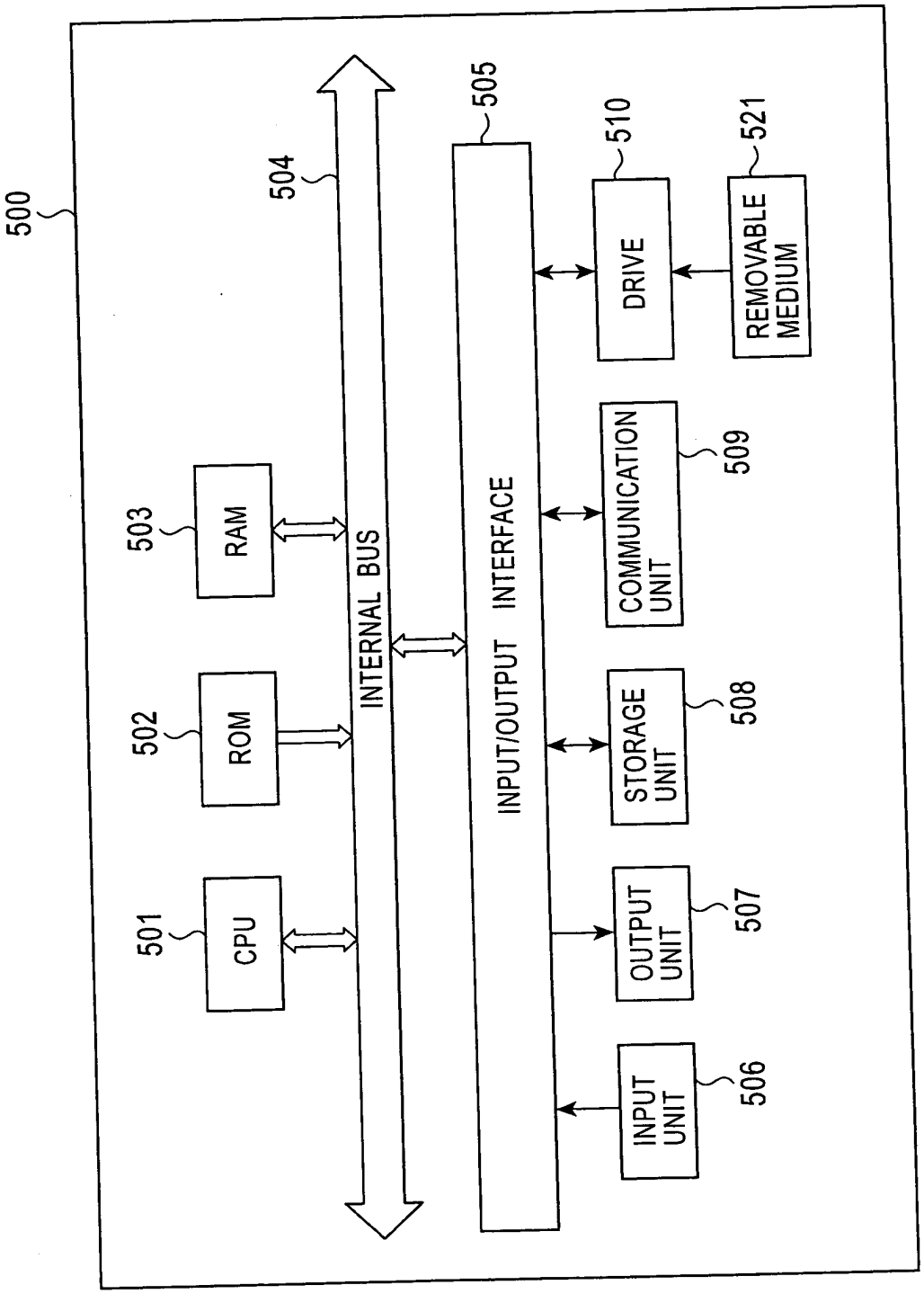

500
504
505
510
521
DRIVE
REMOVABLE MEDIUM
503
RAM
INTERNAL BUS
INPUT/OUTPUT INTERFACE
COMMUNICATION UNIT
509
502
ROM
STORAGE UNIT
508
501
CPU
OUTPUT UNIT
507
INPUT UNIT
506

FIG. 20

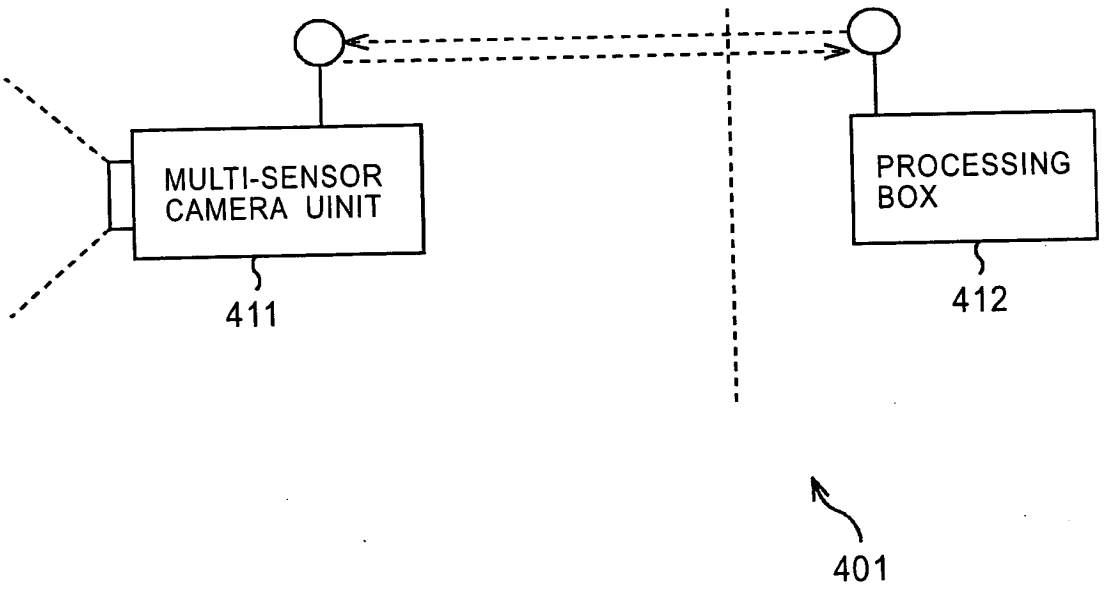


FIG. 21

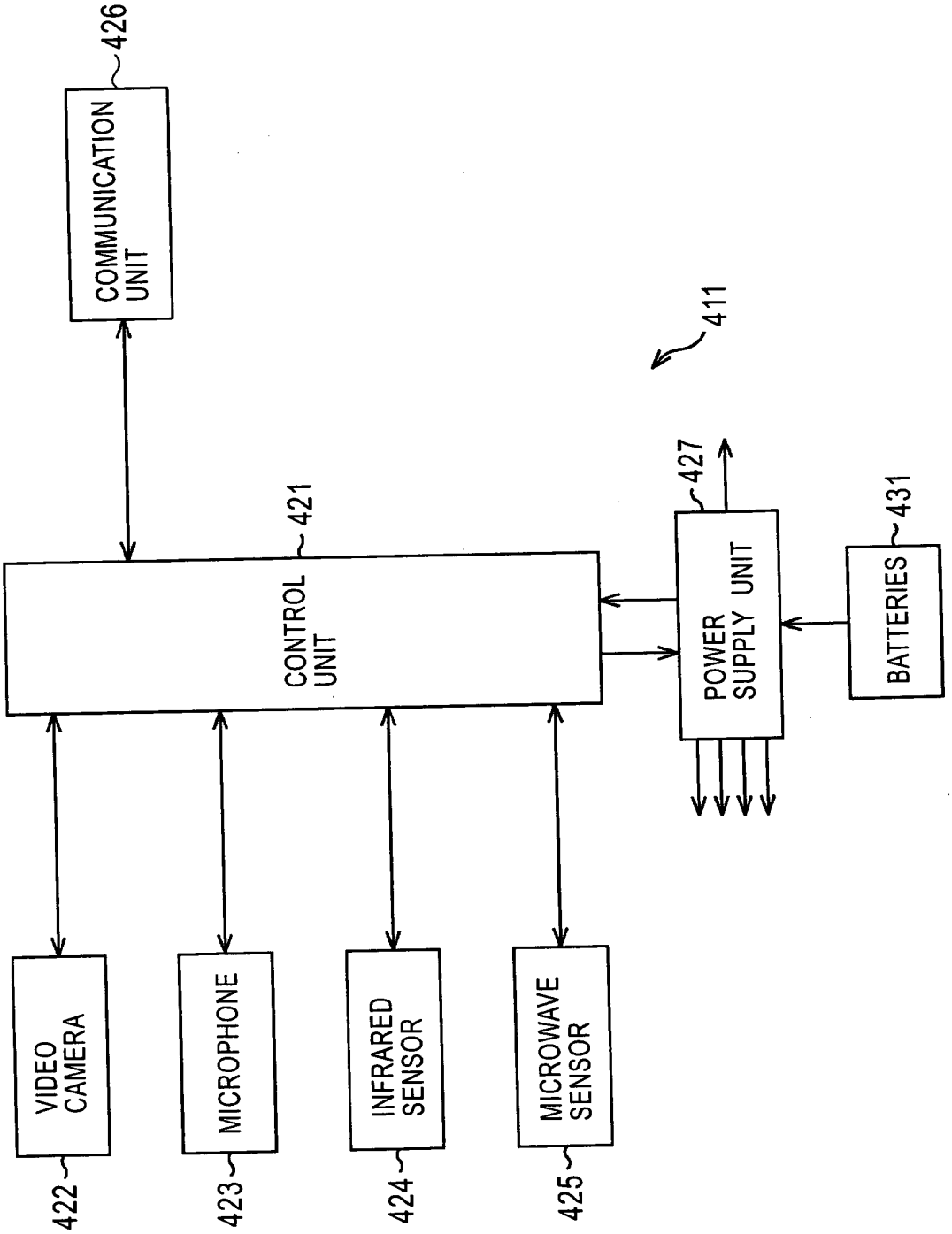

426
COMMUNICATION UNIT
411
427
421
CONTROL UNIT
POWER SUPPLY UNIT
431
BATTERIES
VIDEO CAMERA
MICROPHONE
INFRARED SENSOR
MICROWAVE SENSOR
422
423
424
425

FIG. 22

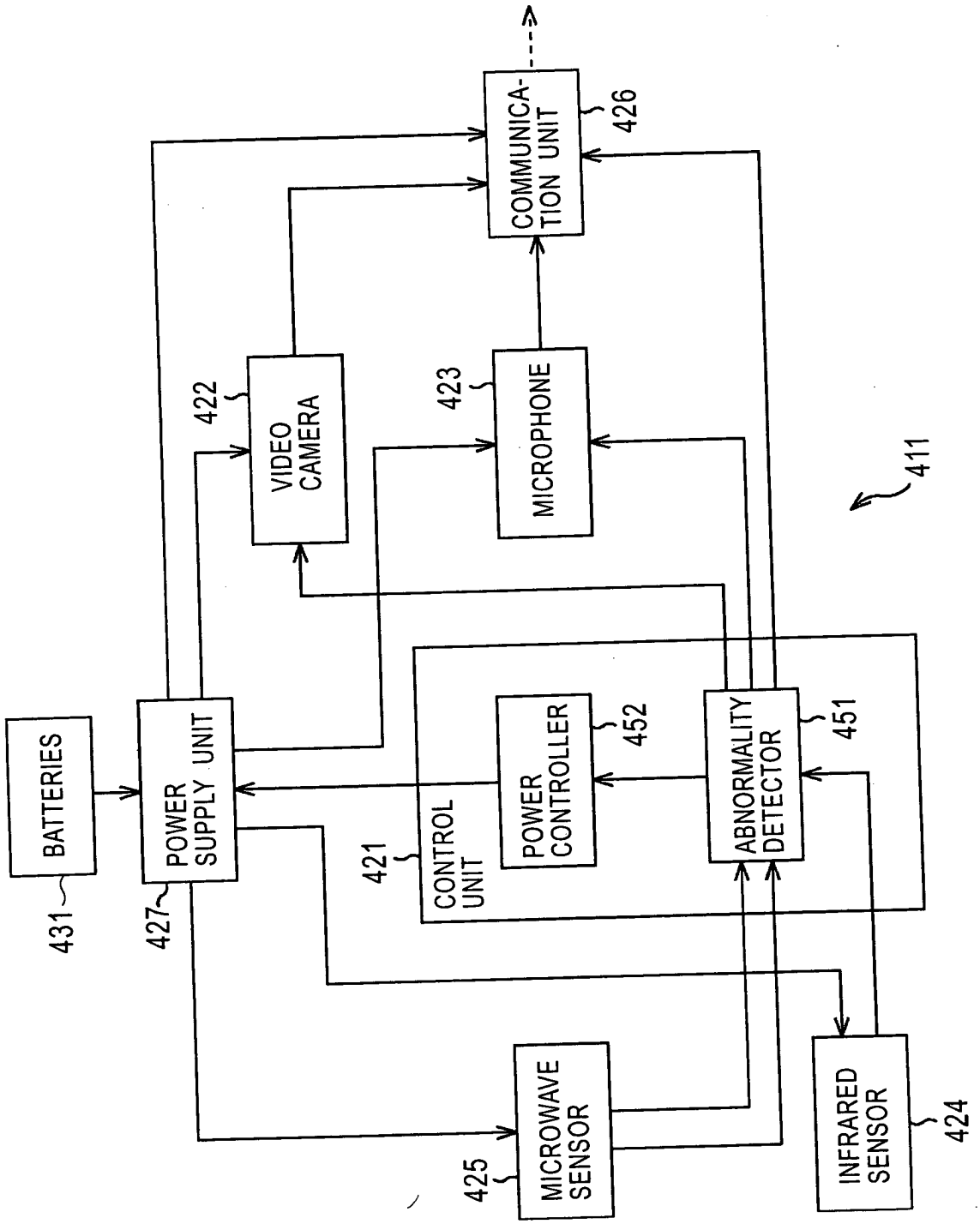

COMMUNICA-TION UNIT
426
VIDEO CAMERA
422
MICROPHONE
423
411
BATTERIES
431
POWER SUPPLY UNIT
427
CONTROL UNIT
421
POWER CONTROLLER
452
ABNORMALITY DETECTOR
451
MICROWAVE SENSOR
425
INFRARED SENSOR
424

FIG. 23

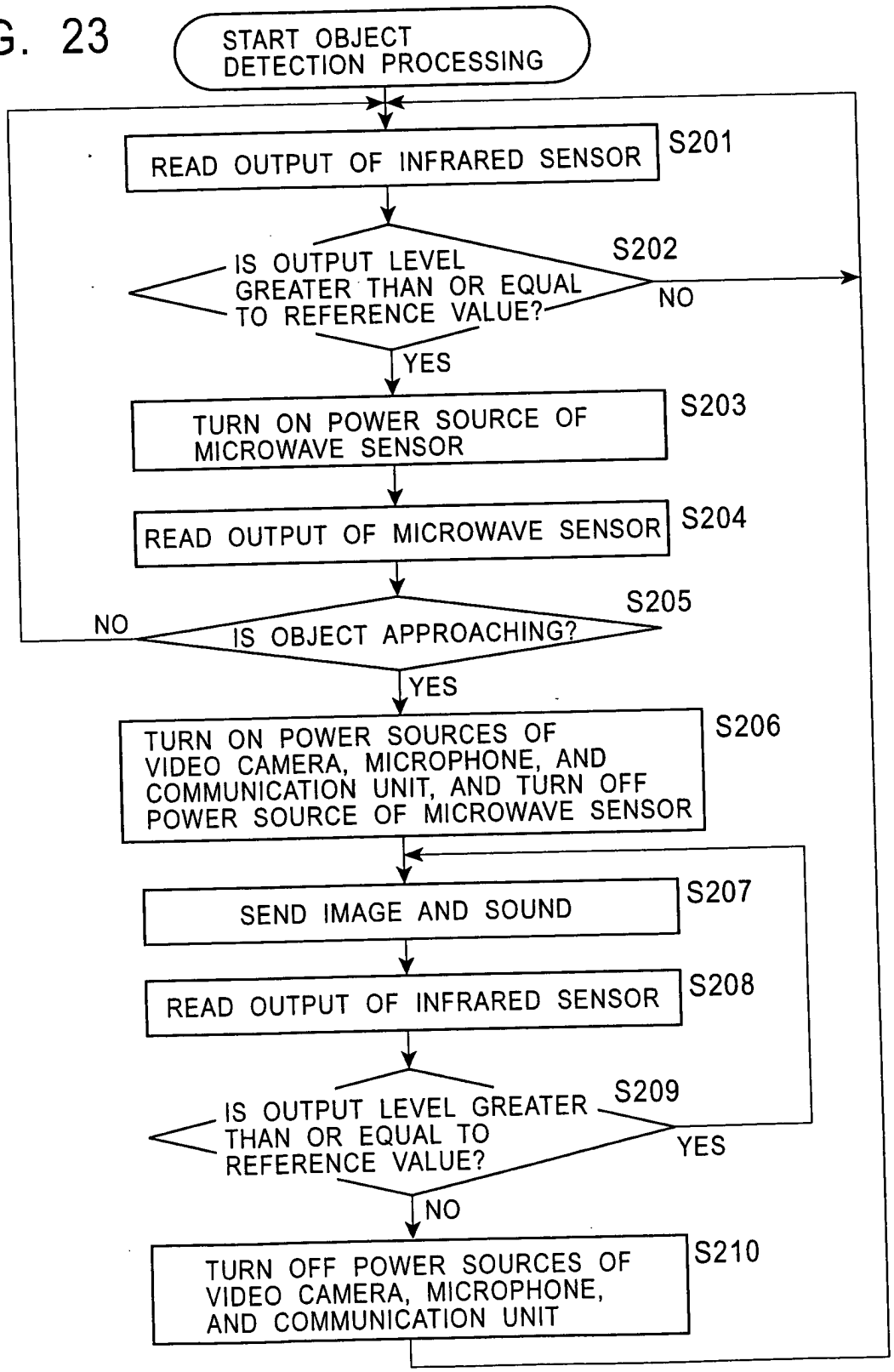

START OBJECT DETECTION PROCESSING
READ OUTPUT OF INFRARED SENSOR
S201
IS OUTPUT LEVEL GREATER THAN OR EQUAL TO REFERENCE VALUE?
S202
NO
YES
TURN ON POWER SOURCE OF MICROWAVE SENSOR
S203
READ OUTPUT OF MICROWAVE SENSOR
S204
IS OBJECT APPROACHING?
S205
NO
YES
TURN ON POWER SOURCES OF VIDEO CAMERA, MICROPHONE, AND COMMUNICATION UNIT, AND TURN OFF POWER SOURCE OF MICROWAVE SENSOR
S206
SEND IMAGE AND SOUND
S207
READ OUTPUT OF INFRARED SENSOR
S208
IS OUTPUT LEVEL GREATER THAN OR EQUAL TO REFERENCE VALUE?
S209
YES
NO
TURN OFF POWER SOURCES OF VIDEO CAMERA, MICROPHONE, AND COMMUNICATION UNIT
S210

FIG. 24

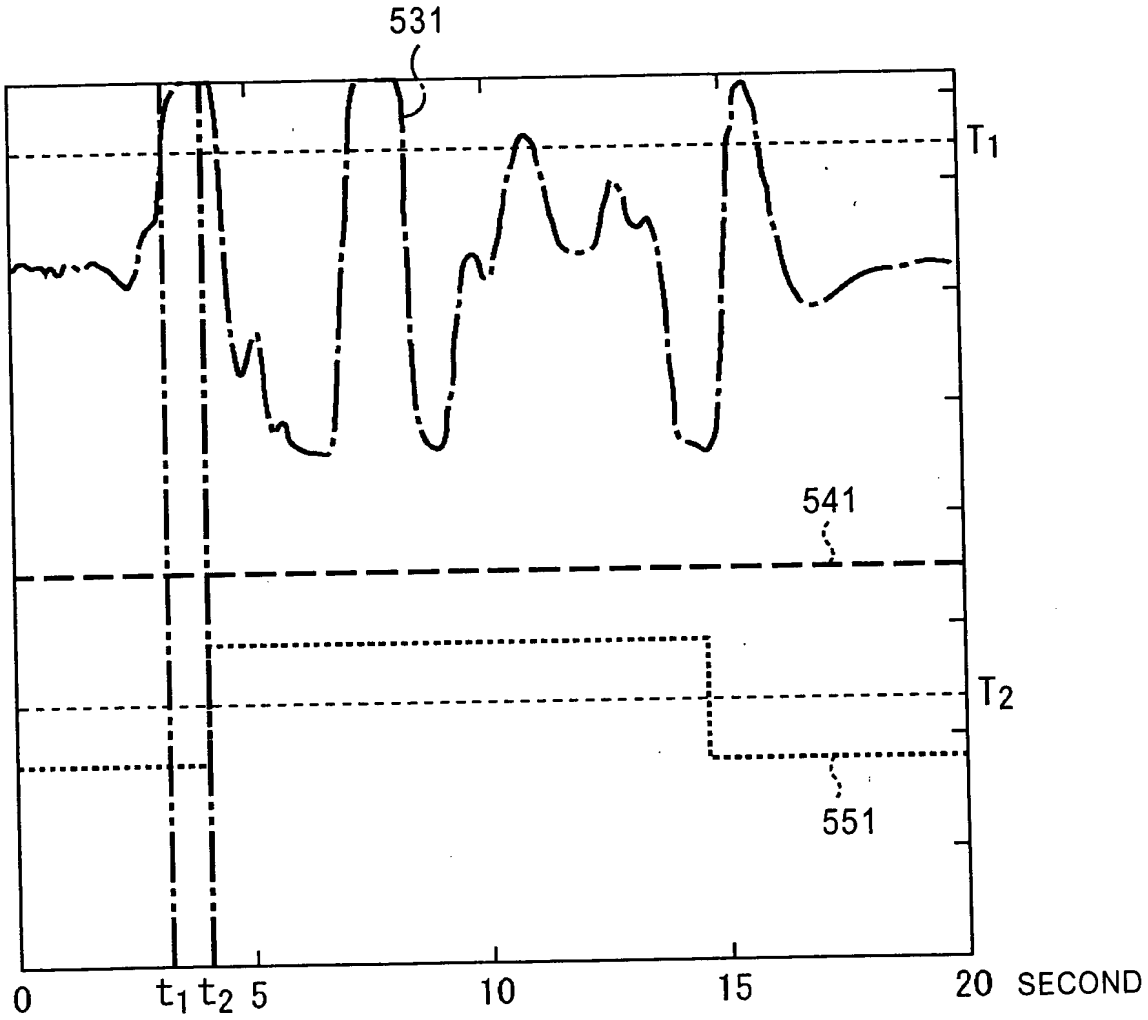


FIG. 25

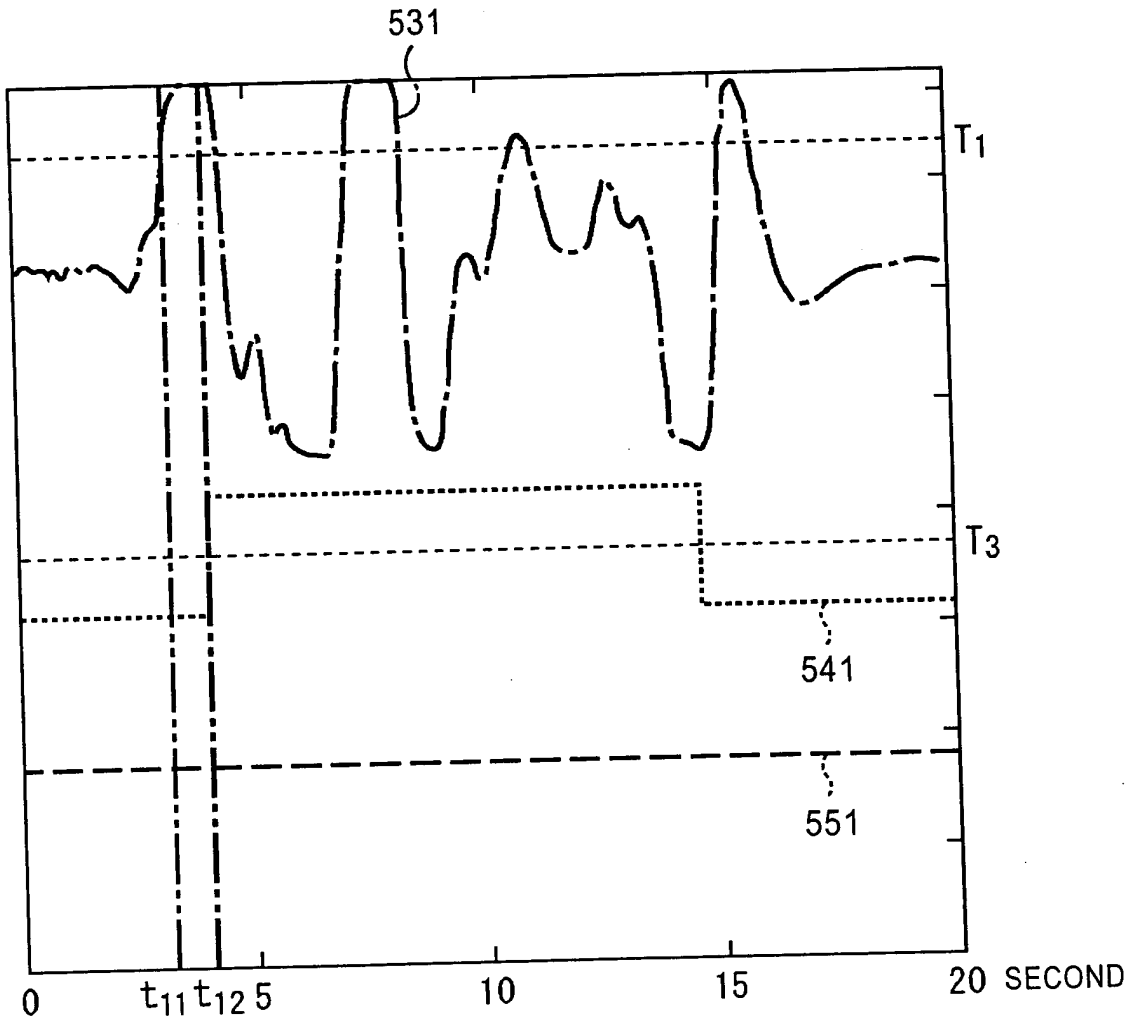


FIG. 26

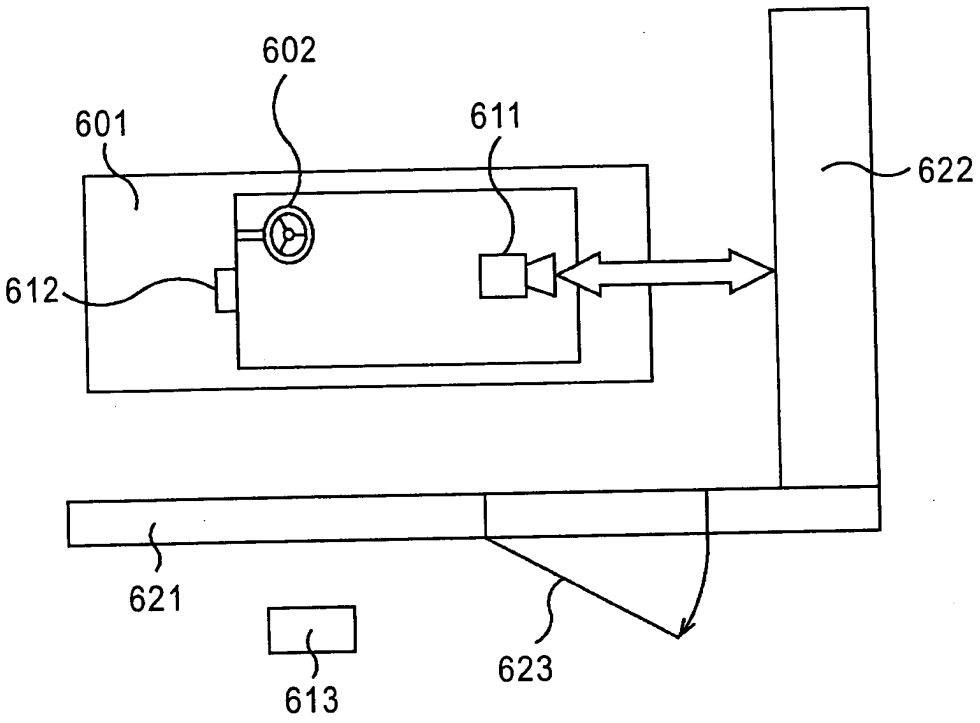


FIG. 27

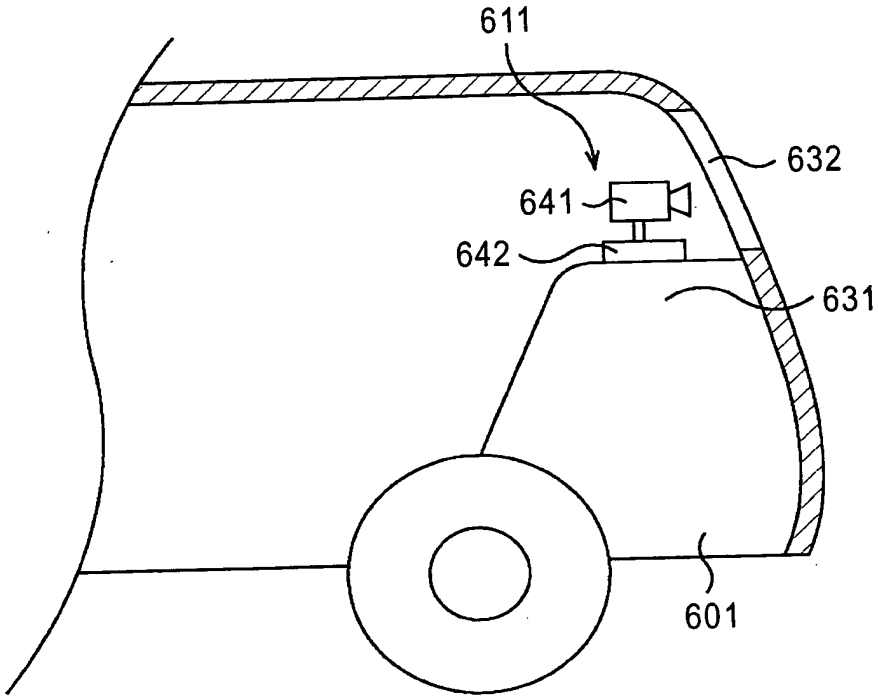


FIG. 28

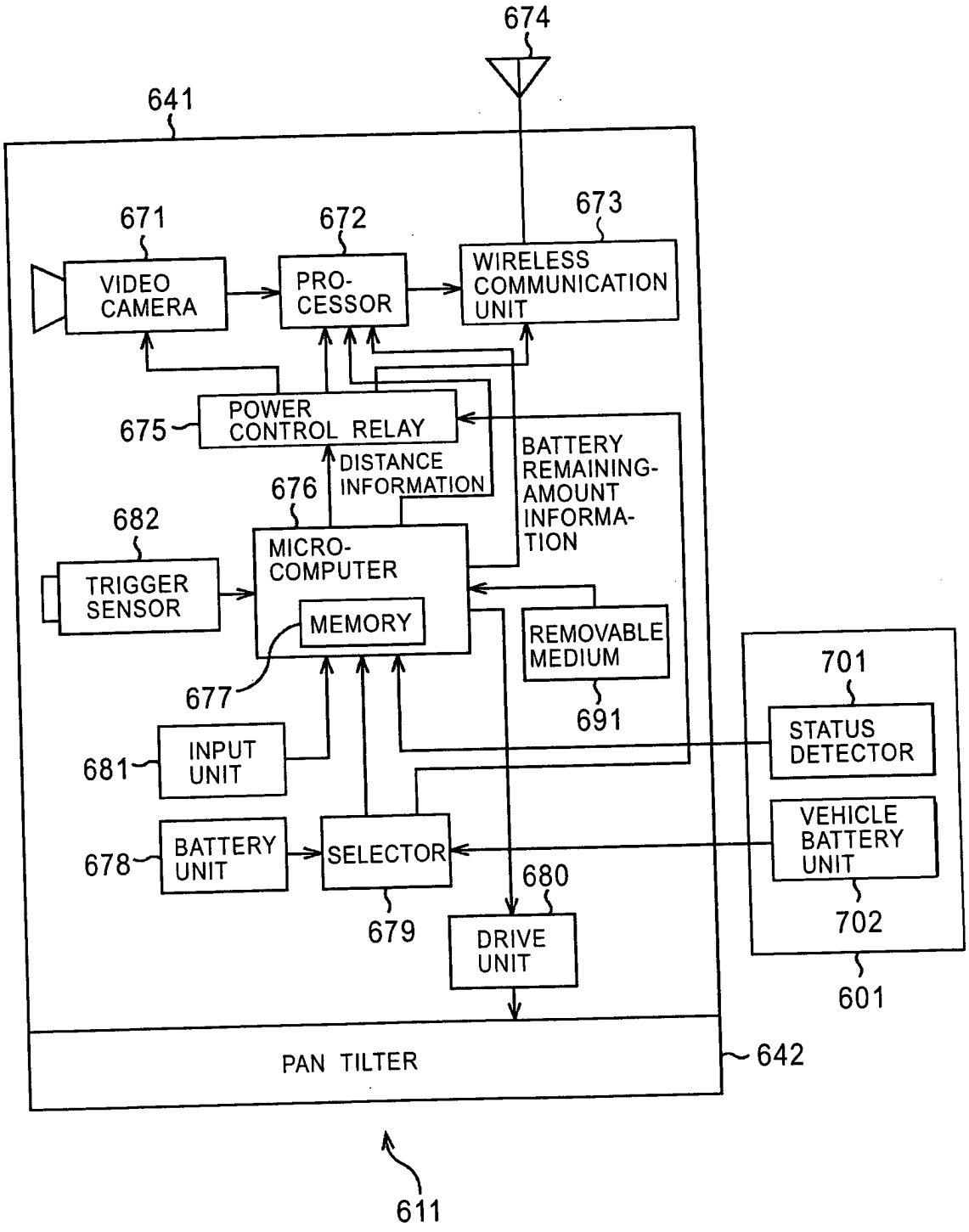

674
641
671
672
673
VIDEO CAMERA
PRO-CESSOR
WIRELESS COMMUNICATION UNIT
675
POWER CONTROL RELAY
DISTANCE INFORMATION
676
BATTERY REMAINING-AMOUNT INFORMA-TION
682
TRIGGER SENSOR
MICRO-COMPUTER
MEMORY
677
REMOVABLE MEDIUM
691
701
STATUS DETECTOR
681
INPUT UNIT
678
BATTERY UNIT
SELECTOR
679
680
DRIVE UNIT
VEHICLE BATTERY UNIT
702
601
PAN TILTER
642
611

FIG. 29

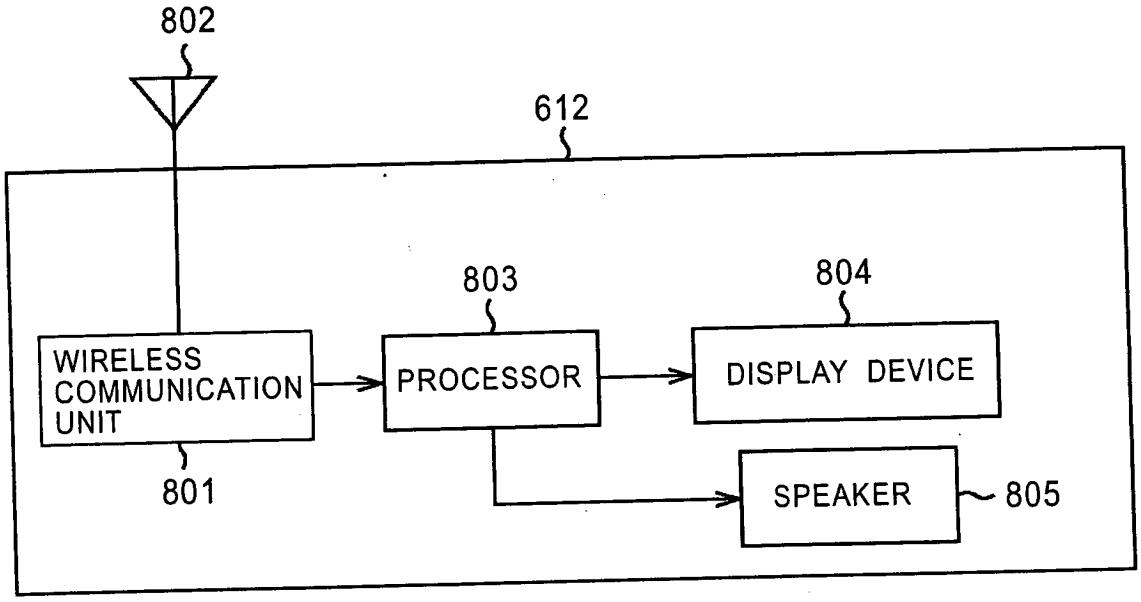

802
612
803
804
WIRELESS COMMUNICATION UNIT
PROCESSOR
DISPLAY DEVICE
801
SPEAKER
805

FIG. 30

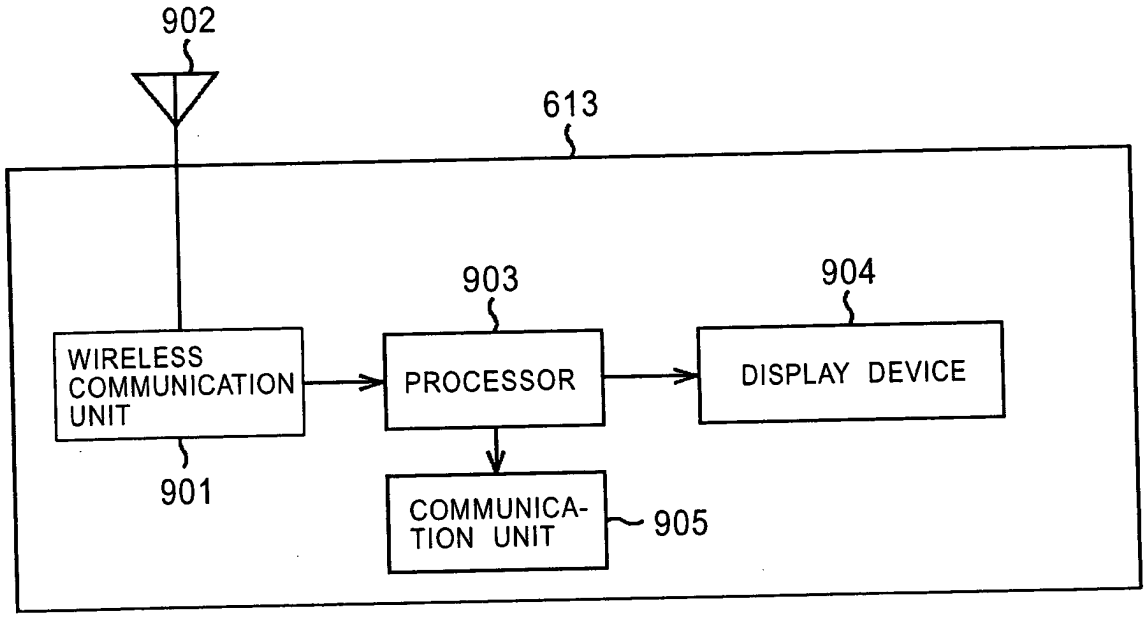

902
613
903
904
WIRELESS COMMUNICATION UNIT
PROCESSOR
DISPLAY DEVICE
901
COMMUNICA-TION UNIT
905

FIG. 31

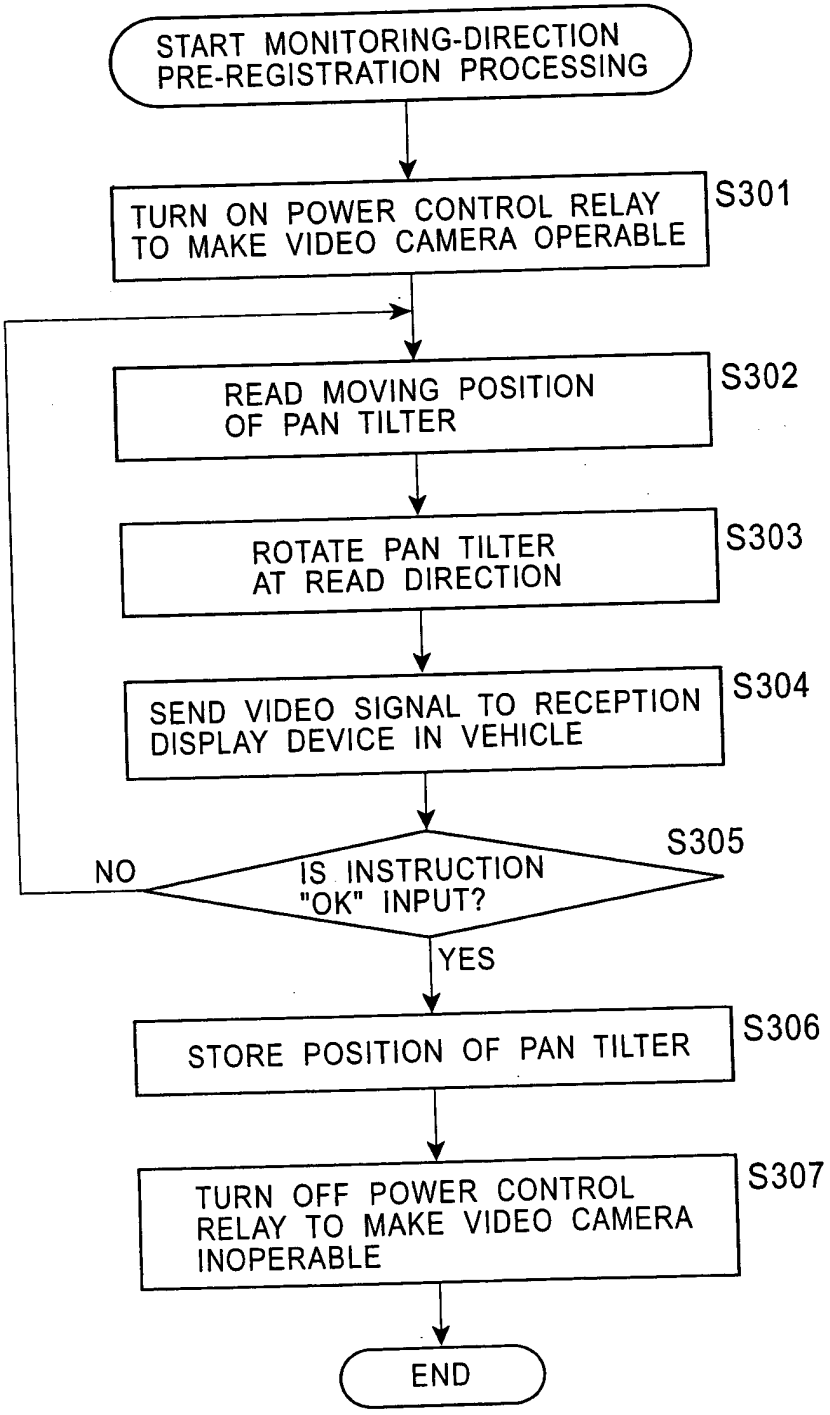

START MONITORING-DIRECTION PRE-REGISTRATION PROCESSING
TURN ON POWER CONTROL RELAY TO MAKE VIDEO CAMERA OPERABLE
S301
READ MOVING POSITION OF PAN TILTER
S302
ROTATE PAN TILTER AT READ DIRECTION
S303
SEND VIDEO SIGNAL TO RECEPTION DISPLAY DEVICE IN VEHICLE
S304
IS INSTRUCTION "OK" INPUT?
S305
NO
YES
STORE POSITION OF PAN TILTER
S306
TURN OFF POWER CONTROL RELAY TO MAKE VIDEO CAMERA INOPERABLE
S307
END

FIG. 32

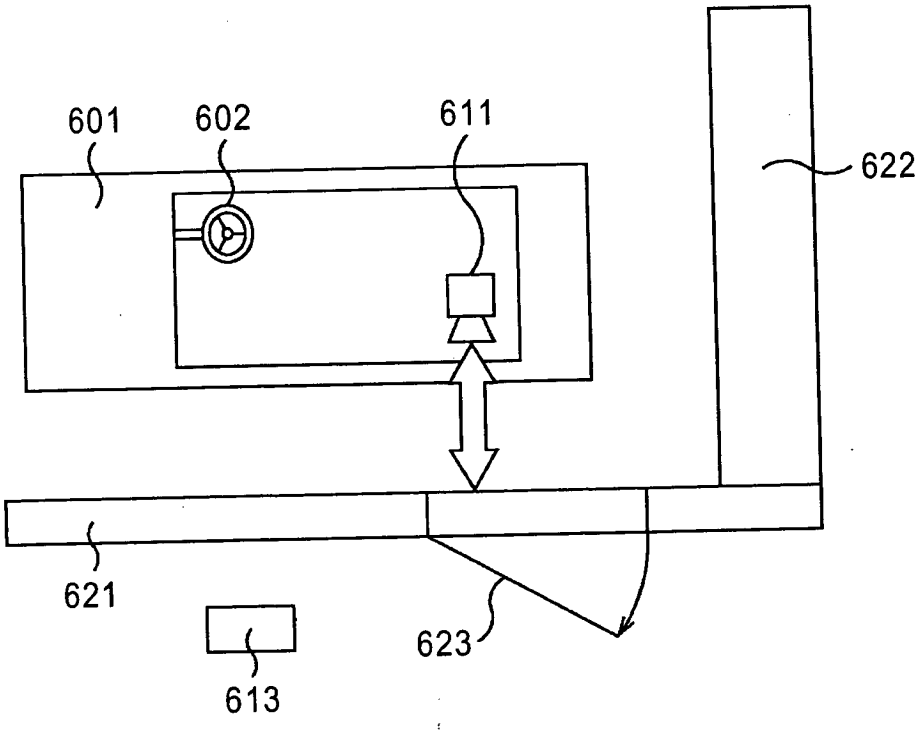


FIG. 33

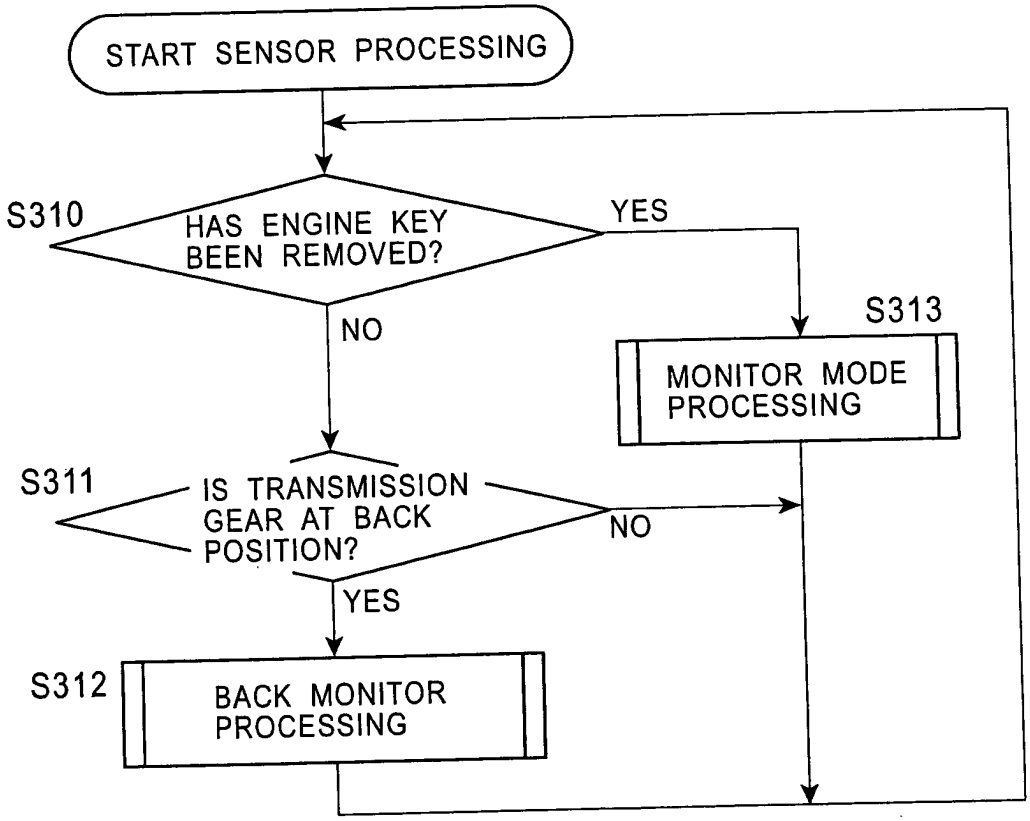

START SENSOR PROCESSING
S310
HAS ENGINE KEY BEEN REMOVED?
YES
NO
S313
MONITOR MODE PROCESSING
S311
IS TRANSMISSION GEAR AT BACK POSITION?
NO
YES
S312
BACK MONITOR PROCESSING

FIG. 34

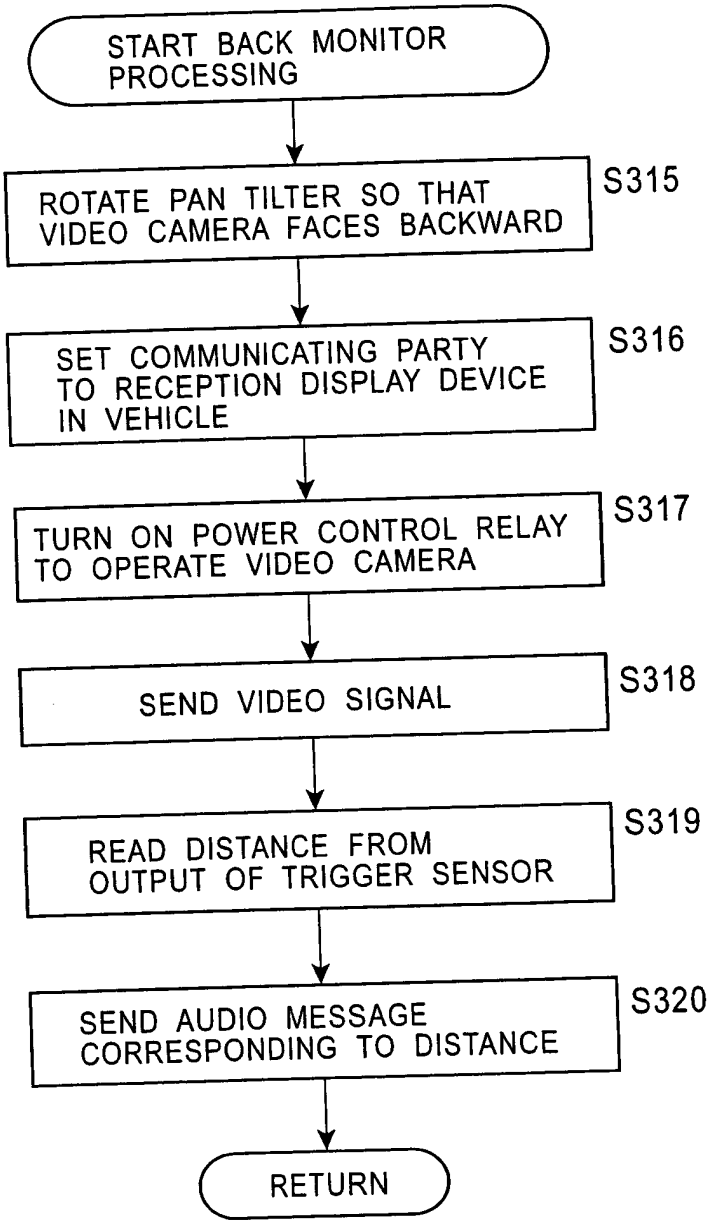
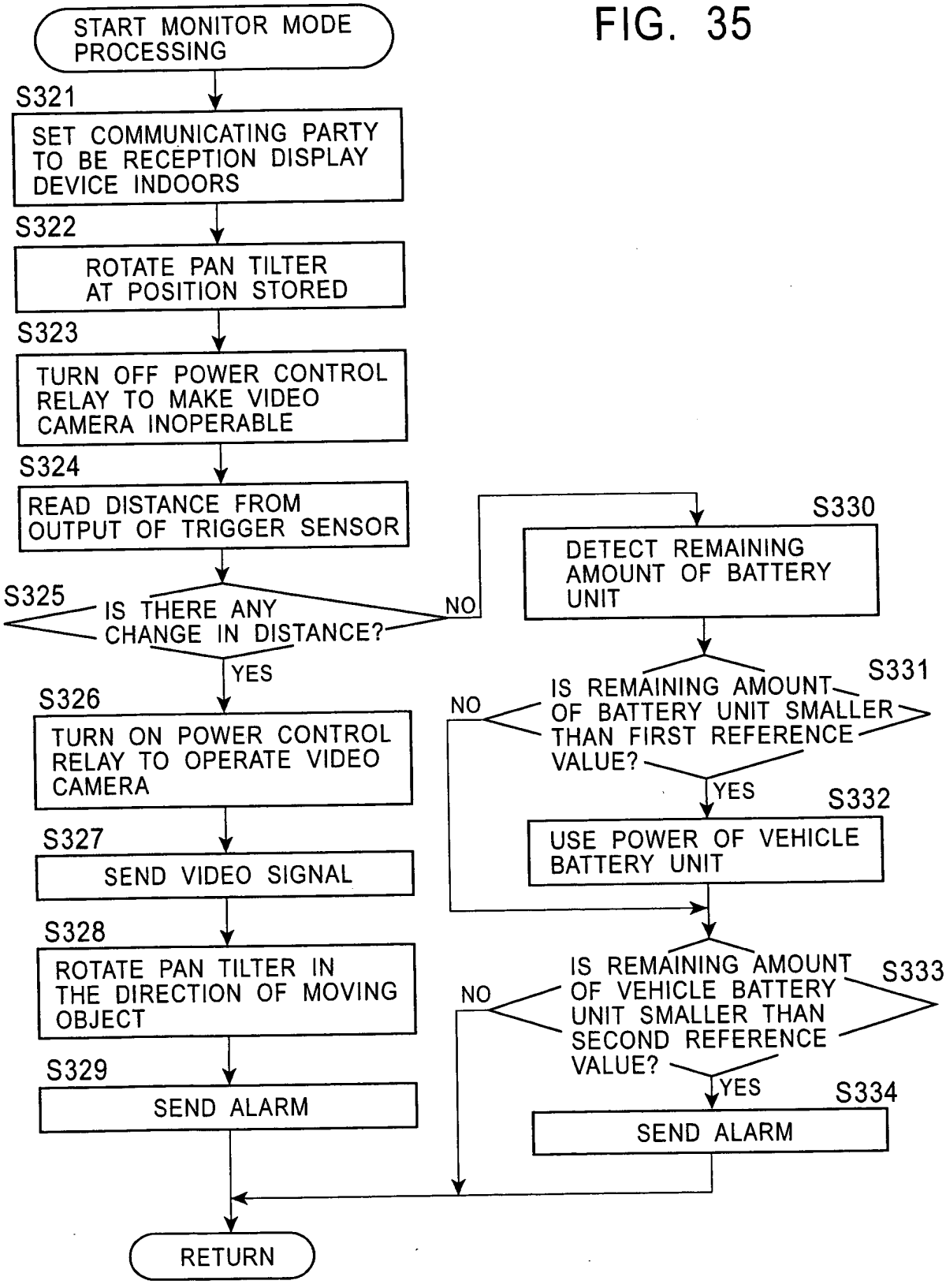

START BACK MONITOR PROCESSING
ROTATE PAN TILTER SO THAT VIDEO CAMERA FACES BACKWARD
S315
SET COMMUNICATING PARTY TO RECEPTION DISPLAY DEVICE IN VEHICLE
S316
TURN ON POWER CONTROL RELAY TO OPERATE VIDEO CAMERA
S317
SEND VIDEO SIGNAL
S318
READ DISTANCE FROM OUTPUT OF TRIGGER SENSOR
S319
SEND AUDIO MESSAGE CORRESPONDING TO DISTANCE
S320
RETURN

FIG. 35


START MONITOR MODE PROCESSING
S321
SET COMMUNICATING PARTY TO BE RECEPTION DISPLAY DEVICE INDOORS
S322
ROTATE PAN TILTER AT POSITION STORED
S323
TURN OFF POWER CONTROL RELAY TO MAKE VIDEO CAMERA INOPERABLE
S324
READ DISTANCE FROM OUTPUT OF TRIGGER SENSOR
S325
IS THERE ANY CHANGE IN DISTANCE?
NO
YES
S326
TURN ON POWER CONTROL RELAY TO OPERATE VIDEO CAMERA
S327
SEND VIDEO SIGNAL
S328
ROTATE PAN TILTER IN THE DIRECTION OF MOVING OBJECT
S329
SEND ALARM
RETURN
S330
DETECT REMAINING AMOUNT OF BATTERY UNIT
S331
IS REMAINING AMOUNT OF BATTERY UNIT SMALLER THAN FIRST REFERENCE VALUE?
NO
YES
S332
USE POWER OF VEHICLE BATTERY UNIT
S333
IS REMAINING AMOUNT OF VEHICLE BATTERY UNIT SMALLER THAN SECOND REFERENCE VALUE?
NO
YES
S334
SEND ALARM